



WETLANDS PERMIT APPLICATION

Water Division/ Wetlands Bureau Land Resources Management

Check the status of your application: www.des.nh.gov/onestop



RSA/Rule: RSA 482-A/ Env-Wt 100-900

Administrative Use Only	Administrative Use Only	Administrative Use Only	File No.
			Check No.
			Amount
			Initials

1. REVIEW TIME: Indicate your Review Time below. To determine review time, refer to Guidance Document A for instructions.

☒ Standard Review (Minimum, Minor or Major Impact)

☐ Expedited Review (Minimum Impact only)

2. MITIGATION REQUIREMENT:

If mitigation is required a Mitigation-Pre Application meeting must occur prior to submitting this Wetlands Permit Application. To determine if Mitigation is Required, please refer to the Determine if Mitigation is Required Frequently Asked Question.

Mitigation Pre-Application Meeting Date: Month: 05 Day: 16 Year: 2018

☐ N/A - Mitigation is not required

3. PROJECT LOCATION:

Separate wetland permit applications must be submitted for each municipality that wetland impacts occur within.

ADDRESS: **NH Route 302 Main Street**

TOWN/CITY: **Bethlehem**

TAX MAP: **N/A**

BLOCK: **N/A**

LOT: **N/A**

UNIT: **N/A**

USGS TOPO MAP WATERBODY NAME: **Unnamed Stream**

☐ NA

STREAM WATERSHED SIZE: **563.2 Acres**

☐ NA

LOCATION COORDINATES (If known): **N: 648950.210411 E: 979235.818857**

☒

4. PROJECT DESCRIPTION:

Provide a brief description of the project outlining the scope of work. Attach additional sheets as needed to provide a detailed explanation of your project. DO NOT reply "See Attached" in the space provided below.

The project will rehabilitate the deteriorating culvert carrying a Tier 2 unnamed tributary to Barrett Brook under US Route 302 that is constructed of multiple segments which vary in material. The work will include installing a slip line rehabilitation consisting of HDPE and Tunnel Liner Plate. (Continued on separate page)

5. SHORELINE FRONTAGE:

☒ NA This does not have shoreline frontage.

SHORELINE FRONTAGE:

Shoreline frontage is calculated by determining the average of the distances of the actual natural navigable shoreline frontage and a straight line drawn between the property lines, both of which are measured at the normal high water line.

6. RELATED NHDES LAND RESOURCES MANAGEMENT PERMIT APPLICATIONS ASSOCIATED WITH THIS PROJECT:

Please indicate if any of the following permit applications are required and, if required, the status of the application.

To determine if other Land Resources Management Permits are required, refer to the Land Resources Management Web Page.

Permit Type	Permit Required	File Number	Permit Application Status
Alteration of Terrain Permit Per RSA 485-A:17	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	_____	<input type="checkbox"/> APPROVED <input type="checkbox"/> PENDING <input type="checkbox"/> DENIED
Individual Sewerage Disposal per RSA 485-A:2	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	_____	<input type="checkbox"/> APPROVED <input type="checkbox"/> PENDING <input type="checkbox"/> DENIED
Subdivision Approval Per RSA 485-A	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	_____	<input type="checkbox"/> APPROVED <input type="checkbox"/> PENDING <input type="checkbox"/> DENIED
Shoreland Permit Per RSA 483-B	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	_____	<input type="checkbox"/> APPROVED <input type="checkbox"/> PENDING <input type="checkbox"/> DENIED

7. NATURAL HERITAGE BUREAU & DESIGNATED RIVERS:

See the Instructions & Required Attachments document for instructions to complete a & b below.

a. Natural Heritage Bureau File ID: **NHB 18 - 0856**

b. ☐ Designated River the project is in ¼ miles of: _____; and
date a copy of the application was sent to the Local River Management Advisory Committee: Month: ____ Day: ____ Year: ____

☒ N/A

lrn@des.nh.gov or (603) 271-2147

NHDES Wetlands Bureau, 29 Hazen Drive, PO Box 95, Concord, NH 03302-0095

www.des.nh.gov

8. APPLICANT INFORMATION (Desired permit holder)			
LAST NAME, FIRST NAME, M.I.: STATE OF NEW HAMPSHIRE (Tobey Reynolds, P.E.)			
TRUST / COMPANY NAME: NHDOT - Highway Design		MAILING ADDRESS: 7 Hazen Drive, PO Box 483	
TOWN/CITY: Concord		STATE: NH	ZIP CODE: 03302-0483
EMAIL or FAX: Tobey.Reynolds@dot.nh.gov		PHONE: (603) 271-7421	
ELECTRONIC COMMUNICATION: By initialing here: <u>TR</u> , I hereby authorize NHDES to communicate all matters relative to this application electronically.			
9. PROPERTY OWNER INFORMATION (If different than applicant)			
LAST NAME, FIRST NAME, M.I.:			
TRUST / COMPANY NAME:		MAILING ADDRESS:	
TOWN/CITY:		STATE:	ZIP CODE:
EMAIL or FAX:		PHONE:	
ELECTRONIC COMMUNICATION: By initialing here _____, I hereby authorize NHDES to communicate all matters relative to this application electronically.			
10. AUTHORIZED AGENT INFORMATION			
LAST NAME, FIRST NAME, M.I.:		COMPANY NAME:	
MAILING ADDRESS:			
TOWN/CITY:		STATE:	ZIP CODE:
EMAIL or FAX:		PHONE:	
ELECTRONIC COMMUNICATION: By initialing here _____, I hereby authorize NHDES to communicate all matters relative to this application electronically.			
11. PROPERTY OWNER SIGNATURE:			
See the Instructions & Required Attachments document for clarification of the below statements			
By signing the application, I am certifying that:			
<ol style="list-style-type: none"> 1. I authorize the applicant and/or agent indicated on this form to act in my behalf in the processing of this application, and to furnish upon request, supplemental information in support of this permit application. 2. I have reviewed and submitted information & attachments outlined in the Instructions and Required Attachment document. 3. All abutters have been identified in accordance with RSA 482-A:3, I and Env-Wt 100-900. 4. I have read and provided the required information outlined in Env-Wt 302.04 for the applicable project type. 5. I have read and understand Env-Wt 302.03 and have chosen the least impacting alternative. 6. Any structure that I am proposing to repair/replace was either previously permitted by the Wetlands Bureau or would be considered grandfathered per Env-Wt 101.47. 7. I have submitted a Request for Project Review (RPR) Form (www.nh.gov/nhdhr/review) to the NH State Historic Preservation Officer (SHPO) at the NH Division of Historical Resources to identify the presence of historical/ archeological resources while coordinating with the lead federal agency for NHPA 106 compliance. 8. I authorize NHDES and the municipal conservation commission to inspect the site of the proposed project. 9. I have reviewed the information being submitted and that to the best of my knowledge the information is true and accurate. 10. I understand that the willful submission of falsified or misrepresented information to the New Hampshire Department of Environmental Services is a criminal act, which may result in legal action. 11. I am aware that the work I am proposing may require additional state, local or federal permits which I am responsible for obtaining. 12. The mailing addresses I have provided are up to date and appropriate for receipt of NHDES correspondence. NHDES will not forward returned mail. 			
 Property Owner Signature		 Print name legibly	6/5/2018 Date

MUNICIPAL SIGNATURES**12. CONSERVATION COMMISSION SIGNATURE**

The signature below certifies that the municipal conservation commission has reviewed this application, and:

1. Waives its right to intervene per RSA 482-A:11;
2. Believes that the application and submitted plans accurately represent the proposed project; and
3. Has no objection to permitting the proposed work.



Print name legibly

Date

DIRECTIONS FOR CONSERVATION COMMISSION

1. Expedited review ONLY requires that the conservation commission's signature is obtained in the space above.
2. Expedited review requires the Conservation Commission signature be obtained **prior** to the submittal of the original application to the Town/City Clerk for signature.
3. The Conservation Commission may refuse to sign. If the Conservation Commission does not sign this statement for any reason, the application is not eligible for expedited review and the application will be reviewed in the standard review time frame.

13. TOWN / CITY CLERK SIGNATURE

As required by Chapter 482-A:3 (amended 2014), I hereby certify that the applicant has filed four application forms, four detailed plans, and four USGS location maps with the town/city indicated below.



Town/City Clerk Signature

Print name legibly

Town/City

Date

DIRECTIONS FOR TOWN/CITY CLERK:

Per RSA 482-A:3,I

1. For applications where "Expedited Review" is checked on page 1, if the Conservation Commission signature is not present, NHDES will accept the permit application, but it will NOT receive the expedited review time.
2. IMMEDIATELY sign the original application form and four copies in the signature space provided above;
3. Return the signed original application form and attachments to the applicant so that the applicant may submit the application form and attachments to NHDES by mail or hand delivery.
4. IMMEDIATELY distribute a copy of the application with one complete set of attachments to each of the following bodies: the municipal Conservation Commission, the local governing body (Board of Selectmen or Town/City Council), and the Planning Board; and
5. Retain one copy of the application form and one complete set of attachments and make them reasonably accessible for public review.

DIRECTIONS FOR APPLICANT:

1. Submit the single, original permit application form bearing the signature of the Town/ City Clerk, additional materials, and the application fee to NHDES by mail or hand delivery.

14. IMPACT AREA:

For each jurisdictional area that will be/has been impacted, provide square feet and, if applicable, linear feet of impact

Permanent: impacts that will remain after the project is complete.

Temporary: impacts not intended to remain (and will be restored to pre-construction conditions) after the project is complete.

JURISDICTIONAL AREA	PERMANENT Sq. Ft. / Lin. Ft.	TEMPORARY Sq. Ft. / Lin. Ft.
Forested wetland	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Scrub-shrub wetland	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Emergent wetland	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Wet meadow	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Intermittent stream	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Perennial Stream / River	417 / 55 <input type="checkbox"/> ATF	619 / <input type="checkbox"/> ATF
Lake / Pond	/ <input type="checkbox"/> ATF	/ <input type="checkbox"/> ATF
Bank - Intermittent stream	/ <input type="checkbox"/> ATF	/ <input type="checkbox"/> ATF
Bank - Perennial stream / River	144 / 52 <input type="checkbox"/> ATF	71 / <input type="checkbox"/> ATF
Bank - Lake / Pond	/ <input type="checkbox"/> ATF	/ <input type="checkbox"/> ATF
Tidal water	/ <input type="checkbox"/> ATF	/ <input type="checkbox"/> ATF
Salt marsh	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Sand dune	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Prime wetland	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Prime wetland buffer	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Undeveloped Tidal Buffer Zone (TBZ)	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Previously-developed upland in TBZ	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Docking - Lake / Pond	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Docking - River	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Docking - Tidal Water	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Vernal Pool	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
TOTAL	561 / 107	690 /

15. APPLICATION FEE: See the Instructions & Required Attachments document for further instruction

☐ Minimum Impact Fee: Flat fee of \$ 200

☐ Minor or Major Impact Fee: Calculate using the below table below

Permanent and Temporary (non-docking) 1,251 sq. ft. X \$0.20 = \$ 250.20

Temporary (seasonal) docking structure: sq. ft. X \$1.00 = \$

Permanent docking structure: sq. ft. X \$2.00 = \$

Projects proposing shoreline structures (including docks) add \$200 = \$

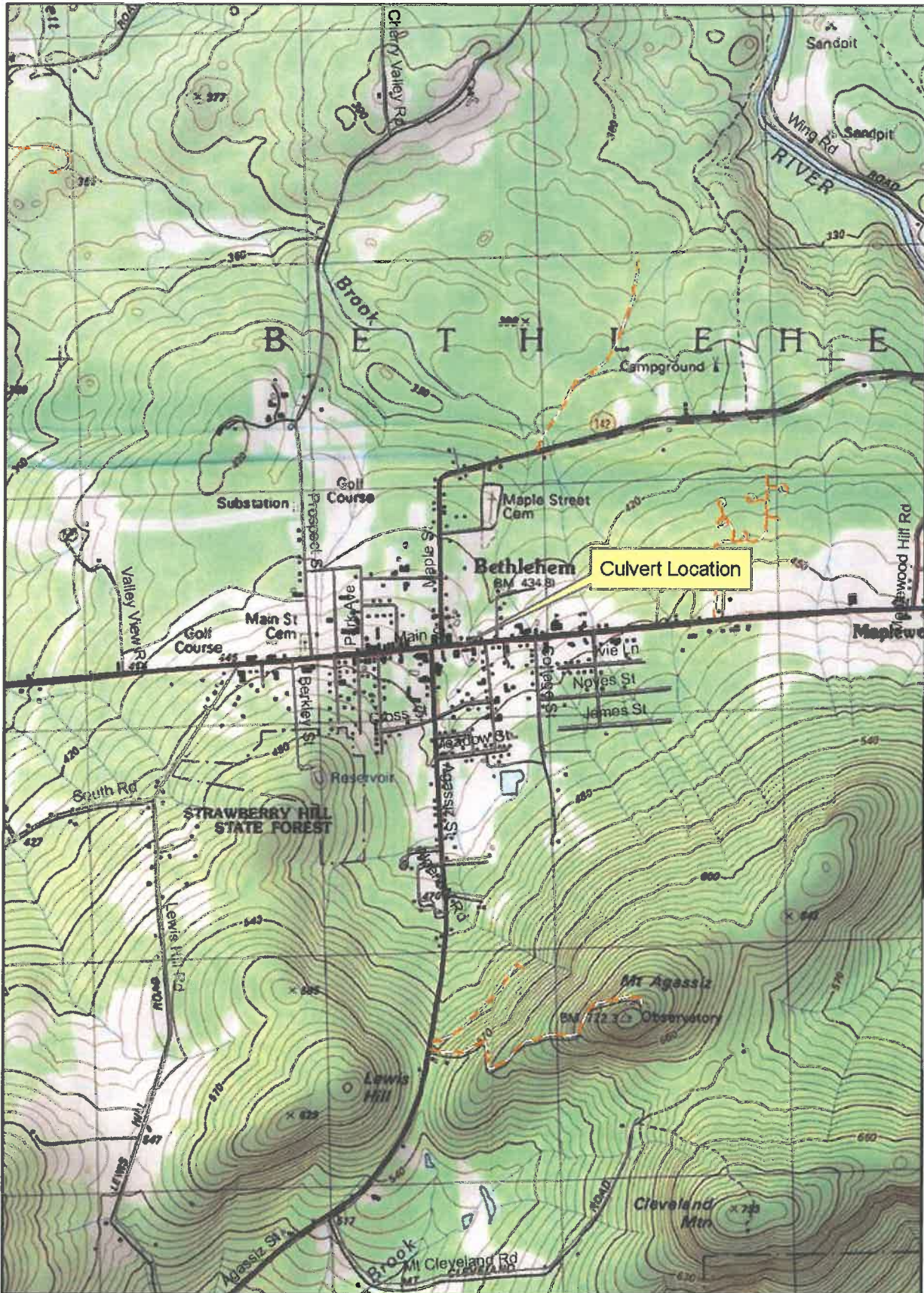
Total = \$ 250.20

The Application Fee is the above calculated Total or \$200, whichever is greater = **\$ 250.20**

4. PROJECT DESCRIPTION – ADDITIONAL SPACE

The retaining walls located at the inlet of the box culvert will be replaced in kind and the channel at the outlet of the culvert will be modified to remove the existing perch by installing a “ramp” or pad made from simulated streambed material to match the outlet’s streambed elevation to the culvert’s outlet invert. Both the work within the channel at the inlet and the outlet will include the use of simulated stream bed material. The existing trunk lines (within the extent shown on the plans) and the existing drop inlet located within the parking lot north of US Route 302 will be replaced with HDPE pipe and connected to the proposed slip lined culvert. A pavement overlay will be placed within the project limits.

Bethlehem, 26763



1 inch = 2,000 feet



WETLANDS PERMIT APPLICATION – ATTACHMENT A
MINOR AND MAJOR - 20 QUESTIONS
 Land Resources Management
 Wetlands Bureau

Check the Status of your application: www.des.nh.gov/onestop



RSA/ Rule: RSA 482-A, Env-Wt 100-900

Env-Wt 302.04 Requirements for Application Evaluation - For any major or minor project, the applicant shall demonstrate by plan and example that the following factors have been considered in the project's design in assessing the impact of the proposed project to areas and environments under the department's jurisdiction. Respond with statements demonstrating:

1. The need for the proposed impact.

The project will rehabilitate the deteriorating culvert carrying an unnamed tributary to Barrett Brook under US Route 302 that is constructed of multiple segments which vary in material. The original culvert is a 56" x 89" mortared stone box which dates back to around 1900. The stone box was extended upstream with a 60" x 72" concrete box and downstream with a corrugated 66" x 90" steel pipe arch.

In 2013 a sink hole developed over the corrugated steel pipe arch section of the culvert and during an inspection by the NHDOT Bridge Design they designated the culvert as a rating of "4" (poor) with the most stable part of the culvert being the original stone box at the inlet.

In 2014 the drainage structure located directly over the existing box culvert (along the eastbound lane of US 302) collapsed.

In 2015 a sink hole developed in the westbound lane of US 302 over the existing closed drainage 18" cmp "trunk line" that connects into the existing mortared stone box section of the culvert. Bridge inspectors also noted the concrete retaining wall along the west edge of the upstream channel is tipping over and has medium-to-long term stability issues that should be addressed.

In 2018 another sink hole developed in the westbound lane of US 302 roughly in the same location as the 2015 sink hole mentioned previously, where the trunk lines tie into the original existing mortared stone box.

2. That the alternative proposed by the applicant is the one with the least impact to wetlands or surface waters on site.

The project originally proposed to remove the entire length of the existing culvert and replace with a 12' x 8' box culvert. The length of the culvert would need to increase from and the existing 175' to a proposed 215' and would have impacted the stream banks at both the inlet and outlet of the proposed culvert. During the design process it was discovered that soil and groundwater located within the adjacent properties to the outlet of the existing box culvert were contaminated with high levels of petroleum and mercury.

Due to the levels of contamination found within the project area the scope of the project need to restrict any excavation within the northern areas (outlet) of the project. A slip lining alternative was developed which will install a combination of approximately 30 LF of 48" x 59" vertically ellipsed HDPE and approximately 145 LF of 51" x 69" vertically ellipsed Tunnel Liner Plate. The impacts to the adjacent streams banks will be due to the replacement of the failing retaining walls at the inlet of the culvert and the channel modification to remove the existing perch at the outlet of the culvert. The amount of impacts will be less than the full replacement alternative.

Another alternative to the options above would be a no build option. In this alternative no work would be performed within the project limits. Eventually the retaining walls at the inlet may fail and fall into the inlet of the stream causing potential for flooding and erosion of the adjacent properties and US 302. Also the culvert and the connections of the trunk lines may fail and cause additional sinkholes to form along US 302 and the adjacent parking lot.

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3. The type and classification of the wetlands involved.
R2UB1,2 - (riverine, lower perennial, unconsolidated bottom, cobble-gravel, sand) Bank
4. The relationship of the proposed wetlands to be impacted relative to nearby wetlands and surface waters.
<p>The wetlands impacted primarily involve the streambed and associated banks of the unnamed stream flowing under US Route 302. Impacts that are associated with the project will not negatively affect nearby wetlands and surface waters. Drainage patterns will be maintained and it is not expected that the hydrology will change.</p> <p>The unnamed brook is a tributary to Barrett Brook about 0.65' downstream.</p>
5. The rarity of the wetland, surface water, sand dunes, or tidal buffer zone area.
<p>The unnamed stream is a common wetland in NH.</p>
6. The surface area of the wetlands that will be impacted.
R2UB12 417 sq. ft. of permanent impact 619 sq. ft. of temporary impact Bank 144 sq. ft. of permanent impact 71 sq. ft. of temporary impact

7. The impact on plants, fish and wildlife including, but not limited to:

- a. Rare, special concern species;
- b. State and federally listed threatened and endangered species;
- c. Species at the extremities of their ranges;
- d. Migratory fish and wildlife;
- e. Exemplary natural communities identified by the DRED-NHB; and
- f. Vernal pools.

- a. No rare or species of special concern were identified by the National Heritage Bureau's (NHB) through their data check tool.
- b. No state listed threatened or endangered species were identified by the National Heritage Bureau's (NHB) through their data check tool. US Fish and Wildlife Services identified the federally listed Northern Long-eared bat and the Canada Lynx as two species with critical habitat within the project area. Through coordination and consultation with Susi von Oettingen, USFWS Endangered Species Biologist in the New England Field Office, on the scope of work it was determined that the impacts will have insignificant or discountable effects on the species. She determined the project will have "No Effect" on NLEB. Susi von Oettingen made her determination based on the lack of suitable NLEB habitat in the project area.
- c. No species at the extremities of their ranger were identified by the National Heritage Bureau's (NHB) through their data check tool.
- d. No migratory fish or wildlofe were identified by the NHB data check tool. However, through coordination with NH Fish and Game's Fish Biologist John Magee, it was determined that strong adult salmonids could be using the existing pipe even with the perched out. The project scope includes the modification of the stream outlet to eliminate the perch to restore connectivyt and to improve passage for the strong adult salmonids through the rehabilitated culvert.
- e. No exemplary natural communities were identified by the National Heritage Bureau's (NHB) through their data check tool.
- f. No vernal pools were identified within the project area.

8. The impact of the proposed project on public commerce, navigation and recreation.

There will be minimal impact to public commerce due to this project. Traffice will be reduced to one way alternating traffice during construction hours (and returned to two lane in the evenings) which will slow the flow of traffic accessing the Post Office, Maya Papaya Coffee Shop, and the Antiques shop/ White Mountain Transmission. If the full replacement alternative was selected buisness to the Post Office and Maya Papaya would have been significant due to the need to eliminate access to the parking area in order to access the structure from above the pavement.

The unnamed stream and crossing are not designated for recreation nor could be used for commercial or recreational navigation.

9. The extent to which a project interferes with the aesthetic interests of the general public. For example, where an applicant proposes the construction of a retaining wall on the bank of a lake, the applicant shall be required to indicate the type of material to be used and the effect of the construction of the wall on the view of other users of the lake.

By replacing and re-setting the retaining walls in-kind this will provide a more pleasing asthetic to the green space area surrounding the unnamed stream and foot bridge over the stream visitors of the Bethlehem Visitor's Center use. The majority of the structure will not be seen by the general public. The slip lining will change the interior appearance of the culvert but will not change the visible appearance.

10. The extent to which a project interferes with or obstructs public rights of passage or access. For example, where the applicant proposes to construct a dock in a narrow channel, the applicant shall be required to document the extent to which the dock would block or interfere with the passage through this area.

The crossing is a state owned structure that does not obstruct or hinder public passage or access. By improving the structure, public safety and passage along US 302 will be improved. There will be temporary one-way alternating traffic during construction hours and returned to two lane traffic flow at night. Access to the green space adjacent to the Visitor's center will be closed temporarily during construction for safety.

11. The impact upon abutting owners pursuant to RSA 482-A:11, II. For example, if an applicant is proposing to rip-rap a stream, the applicant shall be required to document the effect of such work on upstream and downstream abutting properties.

The riprap overlayed with simulated streambed material placed at the inlet will be set at the existing grade of the stream and will not cause water to backwater or scour and will not create upstream or downstream flooding to abutters.

The riprap overlayed with simulated streambed material placed at the outlet will be graded from the streams existing elevation to meet the culvert's outlet invert to eliminate the perched outlet. The purpose of the ramp is to provide better connectivity for stream flow and aquatic organism passage. The simulated streambed material will not cause backwater or scouring and will not create upstream or downstream flooding on abutter's property.

12. The benefit of a project to the health, safety, and well being of the general public.

The proposed work is expected to minimize the potential for additional sink holes forming around the existing culvert, which will help improve public safety on US302 and abutting properties in the area of the culvert.

13. The impact of a proposed project on quantity or quality of surface and ground water. For example, where **an** applicant proposes to fill wetlands the applicant shall be required to document the impact of the proposed fill on the amount of **drainage** entering the site versus the amount of drainage exiting the site and the difference in the quality of water entering and **exiting** the site.

Best Management practices (including a cleanwater bypass) will be in place during construction to minimize erosion and any adverse effect on water quality during construction. Additionally no excavation is proposed at the outlet of the culvert to avoid spreading existing contamination to the downstream water bodies and properties. The surface water currently runs off the road and over the embankments surrounding the stream. Upon completion of the project, surface water will drain in the same manner.

14. The potential of a proposed project to cause or increase flooding, erosion, or sedimentation.

The slip lined culvert has been designed for the 100 year storm event and will not cause or increase flooding as a result. The simulated stream material at the inlet is to prevent erosion and will be installed to provide stabilization of the embankment along the stream. The riprap and streambed simulation at the outlet is intended to eliminate the perched outlet, but will also prevent erosion and stabilize the channel and banks at the outlet.

15. The extent to which a project that is located in surface waters reflects or redirects current or wave energy **which** might cause damage or hazards.

The unnamed brook does not produce enough energy to create waves. The project will not redirect water.

16. The cumulative impact that would result if all parties owning or abutting a portion of the affected wetland or wetland complex were also permitted alterations to the wetland proportional to the extent of their property rights. For example, an applicant who owns only a portion of a wetland shall document the applicant's percentage of ownership of that wetland and the percentage of that ownership that would be impacted.

The Abutters would not be constructing a similar highway design project because it proposes maintenance to an existing element of the public infrastructure and transportation network.

17. The impact of the proposed project on the values and functions of the total wetland or wetland complex.

The proposed rehabilitation will not impact the current functions and values of the wetland (unnamed brook). The function of water being transported from a higher elevation to a lower elevation through the channel and banks of the unnamed stream will remain the same. By modifying the streambed at the outlet to match the culvert's invert connectivity will be improved.

18. The impact upon the value of the sites included in the latest published edition of the National Register of Natural Landmarks, or sites eligible for such publication.

This project is not located in or near any of the following Natural Landmarks listed on the National Register: Lake Umbagog East Inlet and Floating Island, Pondicherry Wildlife Refuge, Franconia Notch, Nancy Brook Scenic Area, Heath Pond Bog, Madison Boulder, White Lake Pitch Pine Forest, Mount Monadnock, Rhododendron Natural Area, and Spruce Hole Bog.

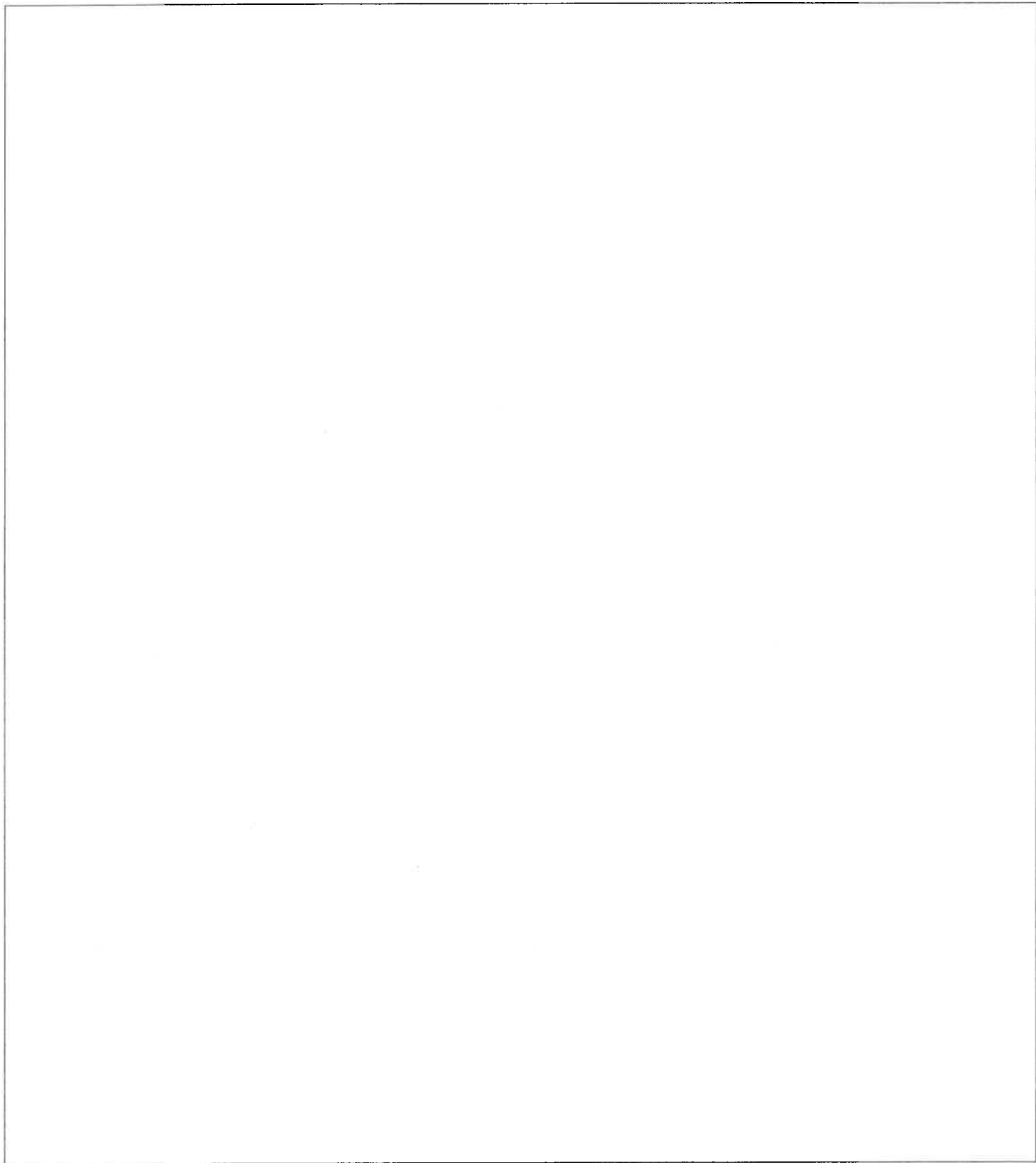
19. The impact upon the value of areas named in acts of congress or presidential proclamations as national rivers, national wilderness areas, national lakeshores, and such areas as may be established under federal, state, or municipal laws for similar and related purposes such as estuarine and marine sanctuaries.

The project does not impact an area named in an act of congress or presidential proclamations as national rivers, national wilderness area, national lakeshores, and such areas as may be established under federal, state, or municipal laws for similar and related puproses.

20. The degree to which a project redirects water from one watershed to another.

The project will not redirect water from one watershed to another. Water within the unnamed stream will continue to flow from higher elevation within the stream's watershed to lower elevation downstream to Barrett Brook.

Additional comments



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BUREAU OF ENVIRONMENT CONFERENCE REPORT

SUBJECT: NHDOT Monthly Natural Resource Agency Coordination Meeting

DATE OF CONFERENCE: May 20, 2015

LOCATION OF CONFERENCE: John O. Morton Building

ATTENDED BY:

NHDOT

Matt Urban
Ron Crickard
Mark Hemmerlien
Jason Savage
David Scott
Tobey Reynolds
Joshua Lafond
Kathleen Corliss
Jon Hebert
Mike Dugas
Rebecca Martin
Jason Tremblay
Colleen White
Jim Kirouac
Michael Licciardi
Steve Glines

Ron Kleiner

**Federal Highway
Administration**

Jamie Sikora

Army Corps of Engineers

Michael Hicks
Richard Kristoff

NHDES

Gino Infascelli
Lori Sommer

NH Fish & Game

Carol Henderson

**NH Natural Heritage
Bureau**

Amy Lamb

Strafford RPC

Colin Lentz

PIM-INC

Todd Kilburn
Jerry Kruegler

CHA

William Horne
Robert Faulkner

PRESENTATIONS/ PROJECTS REVIEWED THIS MONTH:

(minutes on subsequent pages)

Finalization of April 15 th 2015 Meeting Minutes.....	3
Central Turnpike Drainage Rehabilitation Project, 29024, Non-Federal	5
Bethlehem, 26763, X-A004(296)	20
Stewartstown, 16312, X-0001(240)	38
Dixville, 29776, Non-Federal	47
Carroll-Jefferson, 25066, X-A003(023)	59
Conway, 25103, X-A003(039)	68
Cornish, 29024, Non-Federal	93
Farmington, 16146, X-A001(152).....	113

(When viewing these minutes online, click on a project to zoom to the minutes for that project)

recommended considering a beaver pipe (box within a pipe) and suggested contacting Rob Calvert for more information. C. Henderson asked if the hydrology will be changing when pipes are slip-lined and David Smith explained that due to the smoother plastic lining, the capacity of the pipes will not be reduced.

Rebecca Martin explained that the NHB review did result in several rare species that have been identified in or near proposed project areas. Kim Tuttle has been contacted and has requested that John Magee consider fish passage. The size of the watershed of the drainage systems have been calculated and shared with John Magee and Kim Tuttle.

S. Newsom described the timeline for the project, including sending the Wetland Permit to the Bureau of Environment by the end of May, advertising October 6, 2015, and project completion on September 30, 2016.

Matt Urban asked if mitigation will be necessary for the project and Gino Infascelli commented that project plans will be needed to ascertain what the impacts will be. Details and USGS maps of each specific area will be needed. G. Infascelli explained that culverts with Tier 2 streams can be slip-lined, but Tier 3 cannot. Lori Sommer stated that mitigation can be assessed when the project impacts are shown on plans. G. Infascelli made the general comment that it seems that rip rap is excessive at some project locations and to only use what is warranted by field conditions.

S. Newsom shared pictures with C. Henderson at the end of the presentation.

This project has not been previously discussed at a Monthly Natural Resource Agency Coordination Meeting.

Bethlehem, 26763, X-A004(296)

Joshua Lafond provided an overview of the project. The project includes replacement of the culvert that passes under Main Street (Route 302) in Bethlehem east of Route 142 to resolve ongoing issues with maintenance of the existing culvert and to meet the capacity of the water flowing through the culvert. District has experienced difficulties maintaining the existing culvert due to age and instability. A sink hole developed over the culvert in the summer of 2013 due to decay of the structure and one of the drop inlets into the culvert collapsed in 2014 and needed to be replaced. The stream passing through the culvert is an unnamed tributary to Barret Brook. The culvert inlet is adjacent the Bethlehem visitor center and historical society building. The outlet is behind the post office and the Maia Papaya restaurant.

The existing culvert is 170 feet long and is a combination of 3 different construction methods. The original stone masonry culvert is the middle section of the culvert, passing under Route 302 (Main Street). The age of this section is unknown, but a plan from 1920 shows this section as existing. At some point, inlet and outlet extensions were added onto the culvert. The inlet of the culvert is a concrete box and the outlet is a steel arch pipe. No plans have been located for the associated extensions. J. Lafond explained that the inlet of the pipe has two retaining walls which are in poor condition and that one of the retaining walls has begun to fall into the stream. In addition, J. Lafond showed a photograph that demonstrated that the outlet of the culvert is perched and the steel has corroded significantly. In the pipe there are issues with separation of sections of the pipe.

J. Lafond described the proposed project to replace the existing culvert and remove the retaining walls at the inlet and extend the culvert at the outlet. Impacts to the stream and banks are anticipated. At the inlet the estimated area of impact would be around 445 square feet to remove the walls and create a natural slope to the stream on each side. J. Lafond described that the outlet would be extended approximately 20 feet due to the steep slope and that the approximate impacted area would be 970 square feet.

J. Lafond presented the alternatives that were considered. The first and least expensive option would be to rehabilitate the existing culvert. However, rehabilitation would not address the outlet perch and Jim Kirouac stated that the current pipe does not meet the capacity of the water flow. The second alternative was the recommendation of the stream crossing assessment conducted by the Bureau of Environment, a 21 foot 3 sided structure. This alternative has constructability issues due to potential impacts to surrounding potentially historic buildings and Right of Way. The third alternative is a 8 foot wide by 8 foot tall box with 2 feet of embedment that would meet culvert design requirements and capacity for a 50 year storm. The preferred alternative is a 12 foot wide by 8 foot tall box with 2 feet of embedment, which would be designed to meet capacity for a 100 year storm and bridge design requirements, as structures with spans greater than 10' are classified as bridges and sized accordingly. This is the preferred alternative because it provides greater resiliency. J. Lafond showed a depiction of the 21 foot span and impacts to adjacent structures to illustrate the constructability issues.

J. Lafond and J. Kirouac provided a description of the trunk lines that currently feed stormwater from the roadway into the culvert. A sink hole developed this spring over the trunk line just west of the culvert and is in need of repair. The intent with this project is to only address the trunk line issues immediately adjacent to the culvert, as the entire road and drainage are in need of rehabilitation at a future date. J. Kirouac explained that the trunk lines are metal or concrete where they attach to the culvert, but are clay further east and west of the project area. J. Lafond also mentioned that the drop inlet that feeds directly into the culvert will be redesigned to not drop directly into the culvert.

Carol Henderson asked for more information about the construction of the replacement box culvert. J. Kirouac described that the box would likely be pre-cast concrete sections with rubber gaskets.

Lori Sommer and Matt Urban explained that there will be mitigation required for impacts to the stream from extension of the outlet of the culvert. J. Kirouac explained that the intent behind the extension is to attempt to achieve 2:1 slopes, which would be more stable than the existing 1:1 slopes. Gino Infascelli warned that the parking lots of the adjacent businesses may extend when the culvert extends. He recommended controlling project creep as part of the Right of Way process. The group seemed supportive of the preferred alternative.

This project has not been previously discussed at a Monthly Natural Resource Agency Coordination Meeting.

BUREAU OF ENVIRONMENT CONFERENCE REPORT

SUBJECT: NHDOT Monthly Natural Resource Agency Coordination Meeting

DATE OF CONFERENCE: November 16, 2016

LOCATION OF CONFERENCE: John O. Morton Building

ATTENDED BY:

NHDOT

Matt Urban
Sarah Large
Ron Crickard
Mark Hemmerlein
Marc Laurin
Jon Evans
Rebecca Martin
Anthony Weatherbee
Don Lyford
Leah Savage
Jon Hebert
Jim Kirouac
Ali Skinner
Kathy Corliss
Tim Mallette
Josh Lafond
Chris Carucci
Carol Niewola

Stephanie Micucci

Bill Saffian
Colleen White
Kirk Mudgett
Wendy Johnson
Dave Smith

Army Corps of Engineers

Rick Kristoff

NHDES

Gino Infascelli
Lori Sommer

NH Fish & Game

Carol Henderson
John Magee

NH Natural Heritage

Bureau

Amy Lamb

Consultants/Public

Participants

Christine Perron
Brian Patinskas
Josh Lund
Jed Merrow
Steve Hoffmann
Dave Kull
Don Kretchmer
Ryan Lizewski
Bill Arcieri
John Gorham
Marv Everson
Martha Drukker

(When viewing these minutes online, click on an attendee to send an e-mail)

PRESENTATIONS/ PROJECTS REVIEWED THIS MONTH:

(minutes on subsequent pages)

Finalization of September 21 st and October 19 th 2016 Meeting Minutes.....	2
Littleton 41224, Non-Federal	2
Kingston 41222, (Non-Federal).....	3
Swanzey 41223, (Non-Federal)	3
Barnstead 16020, (Non-Federal)	4
Meredith 10430, (Non-Federal).....	6
Ossipee 10431, (Non-Federal).....	7
Bethlehem 26763, (X-A004(296))	9
Roxbury-Sullivan 10439 (F-X-0121(034))	10
Concord 28417, (X-A003(741)).....	11
Laconia Apt. TW E ext. (SBG-09-13-201)	14
Nashua-Merrimack-Bedford 13761 (IM-0931(201))	16

(When viewing these minutes online, click on a project to zoom to the minutes for that project)

Carol Henderson noted that Kim Tuttle has previously provided some guidance regarding notifications for sightings of snakes and nesting turtles and utilization of wildlife friendly erosion control. C. Henderson also recommended that pipe replacements are not perched.

R. Martin noted that at the time of the meeting it was unlikely that area near the temperate minor river floodplain system north of the intersection with Route 16B would be impacted by the design as it did not seem that the considered stormwater treatment would fit in this area. ***After the Natural Resources Agency Coordination meeting R. Martin received notice that due to a lack of options for treatment the opposite side of Route 16 north of the intersection with Route 16B is once again under consideration as a potential placement for treatment.

This project has been previously discussed at the 8/17/16 Monthly Natural Resource Agency Coordination Meetings.

Bethlehem 26763, (X-A004(296))

The proposed project is a Culvert Replacement on US 302 between Maple St (NH 142) and Congress Road. Rebecca Martin explained the project had been reviewed previously (5/15/2015). The Design team was returning to update the agencies on a modification to the design and resultant impacts. The stream through the structure is a tributary to Barrett Brook. Josh Lafond described the poor condition of the structure including the currently perched condition of the outlet. He also described the anticipated project impacts including around 20 feet of channel impacts and 40 feet of bank impacts at the inlet and around 97 feet of channel impacts and 210 feet of bank impacts at the outlet.

J. Lafond described the modifications to the design of the project:

- Removal of culvert alignment curvature: the new design proposes to replace the formerly currently curved culvert option with a straight culvert, requiring an increase in impacts to the stream
- Slight alignment shift to the west in order to minimize impacts to the Antique/Auto transmission property: the former design would have required a retaining wall to protect the foundation of the building
- Lengthening of the structure to accommodate pedestrian crossing on the Bethlehem Historical Society property (an existing foot bridge will be removed) and flattening the roadway embankment slope to 2:1 above the outlet. The current structure is 172' long and the proposed structure is 215' long
- Substitution of a baffle design in place of the originally anticipated embedded design to control water depth in the culvert to accommodate fish passage
- Addition of a downstream water control structure at the outlet of the structure
- Lowering of the roadway profile to accommodate positive drainage to the roadway from adjacent properties
- Formalization of the drive entrances and parking at Maia Papaya/Post Office and Town Hall/Fire Department to improve safety and egress by Emergency vehicles, and result in a slight reduction to impervious pavement
- Reconstruction of Route 302 (full box) through the project area and new trunk lines to collect storm water and deposit into the culvert with new catch basins

- The project area has expanded from being centered around the culvert to extending from the intersection with Maple Street to 50' west of the intersection with Elm Street, increasing the length of roadway reconstruction from 200' to 550'.

J. Lafond noted 2 existing stormwater trunk lines and 2 Drop Inlets currently drain directly into the existing culvert (4 storm water lines into the culvert). At the previous meeting with the smaller scope, it was anticipated that the existing trunk lines would be directed to new Catch Basins before draining into the new culvert. The Catch Basins have a 3' sump below their outlet pipe. This design allows larger particles of sediment (gravel, sand, asphalt pieces, etc.) to settle out below the outlet pipe. With the project scope increased, consideration is now being given to identifying a possible stormwater treatment area which could be difficult given the tightly restricted area, limited ROW, and steep topography. The current project design will reduce impervious area by around 3%.

Tim Mallette explained the premise for moving to a baffle design – primarily the 3% culvert slope, though flatter than the existing slope of 5%, was anticipated to be too steep to successfully retain natural streambed materials. A proposed baffle design (tapered baffles with water pools) would allow for controlling a minimum water depth that would accommodate fish passage. The group discussed fish passage and if sufficient depth and length between the baffles will accommodate fish movement through the structure. The shape of the “V” baffles taper from 22” at the box culvert sidewalls to 12” at the center of the “V” at the centerline of the box. John Magee from F&G recommended that the pool elevations, from the sequential lower baffle, be high enough to minimize the height the fish is required to jump over the next upstream baffle. Ideally, the lower pool elevation should be at the same elevation as the next upstream baffle. T. Mallette confirmed that this is the intention. T. Mallette asked the group for suggestions to accommodate passage for other animals. Carol Henderson explained that because of the length and darkness inside the structure, most animals would be discouraged from moving through the structure. She stated that it would be best to concentrate on fish.

Conclusion: Fish passage seemed to be the primary concern at the crossing, as the proposed 215' culvert length was not anticipated to be conducive to other AOP passage, such as turtles.

This project has been previously discussed at the 5/20/2015 Monthly Natural Resource Agency Coordination Meetings.

Roxbury-Sullivan 10439 (F-X-0121(034))

Bill Saffian gave an overview of the replacement the Red Listed NH Route 9 bridge over Otter Brook in Sullivan. The existing 39 foot two-span bridge will be replaced with a 60 foot single span (both span dimensions measured perpendicular to stream flow). The bridge is scour critical and two options to address scour protection to the Q500 volume have been evaluated. The first option would excavate the footings to a depth that would provide protection from the predicted scour. The second option would use riprap around the footings and abutments as the scour countermeasure.

One aspect that needs to be considered is constructability of the bridge within a single season as the proposed detour along the narrow Valley Road consisting of two sharp 90 degree turns from NH 9

BUREAU OF ENVIRONMENT CONFERENCE REPORT

SUBJECT: NHDOT Monthly Natural Resource Agency Coordination Meeting

DATE OF CONFERENCE: March 21, 2018

LOCATION OF CONFERENCE: John O. Morton Building

ATTENDED BY:

NHDOT

Matt Urban
Sarah Large
Ron Crickard
Steve Johnson
Doug Locker
Meli Dube
Joseph Adams
Mac Laurin
Ron Kleiner
Rebecca Martin
Josh Lafond
John Sargent
Tobey Reynolds

ACOE

Mike Hicks

EPA

Mark Kern

NHDES

Gino Infascelli
Lori Sommer
Ryan Duquette

NHF&G

John Magee

NH Natural Heritage

Bureau

Amy Lamb

Consultants/Public

Participants

Christine Perron
Kim Smith
Josh Lund

(When viewing these minutes online, click on an attendee to send an e-mail)

PRESENTATIONS/ PROJECTS REVIEWED THIS MONTH:

(minutes on subsequent pages)

Finalization of the December 20 th and January 21 st Natural Resource Agency Meeting Minutes.....	2
Eaton, #41864 (Non-Federal).....	2
Madison, #40775 (Non-Federal)	2
Orford, #40366 (X-A004(371)).....	3
Portsmouth, #27690 (X-A003(589))	5
Bethlehem, #26763 (X-A004(296))	6

(When viewing these minutes online, click on a project to zoom to the minutes for that project)

groups, including the Hodgson Brook Local Advisory Committee. The right-of-way on the outlet side does not provide sufficient space for a weir or rock vane that would raise the water elevation. Therefore, to address the perch, imported streambed material will be placed at the outlet and shaped to grade up to the invert. The stone will result in approximately 200 sq ft of permanent impact along approximately 15 linear feet of channel. Since the stone is not required to address concerns with the structure itself, addressing fish passage is the only reason permanent impacts will be necessary for this project.

Mike Hicks asked if the stream is tidally influenced. C. Perron replied that it is freshwater with no tidal influence.

Gino Infascelli asked if the concrete invert of one of the cells could be lowered 1 to 2 inches to help provide deeper water for fish passage. J. Sargent responded that this would be possible. The upstream side of the structure has a 4" lip at the invert. The intent is to remove this lip in one cell to allow more water to enter the cell, resulting in 3" to 4" deeper flow than the other cells.

John Magee recommended using well-blended stone material to prevent voids that could lead to hyperheic flow, which would also create a barrier to fish passage.

Lori Sommer stated that mitigation would not be required since the stone would address fish passage concerns and could be considered self-mitigating.

Mike Hicks commented that there is a known bat hibernaculum in Portsmouth. C. Perron noted that it was not reported by the Natural Heritage Bureau. This likely means that it is not in the vicinity of the project, but she would look into this.

The project is scheduled to advertise in September 2018, so the permit application would be submitted within the next month.

This project has been previously discussed at the 1/20/2016 Monthly Natural Resource Agency Coordination Meeting.

Bethlehem, #26763 (X-A004(296))

The proposed project will address a culvert under Main Street (US Route 302) between Maple St (NH Route 142) and Congress Road in Bethlehem. The project had been reviewed previously (5/15/2015 and 11/16/2016). The Design team was returning to update the agencies on a modification to the design. The stream through the structure is a tributary to Barrett Brook. Josh Lafond explained that the culvert has been dubbed the 'Franken-culvert' because it is made up of several different materials. J. Lafond explained that there is a lot of impervious surface in the project area and showed pictures of the project area. He described that the culvert goes under a local business parking lot. At the inlet the culvert has around 7 feet of cover and at the outlet there is around 11 feet of cover.

J. Lafond described the poor condition of the structure including the currently perched condition of the outlet. He showed photos of the winter collapse of a catch basin, a sink hole, and the failing

upstream concrete retaining walls at the culvert inlet. J. Lafond also showed a photo of the wooden bridge that was donated to the town that is near the Bethlehem Visitor Center. J. Lafond showed pictures from inside the culvert and explained that District had informed the design team that this culvert requires a lot of maintenance. At the outlet, the pipe is steel and has corroded and separated. J. Lafond described the slope of the existing stream and culvert. At the inlet there is a 3.5% slope, through the culvert the slope is ~4% and at the outlet the slope is 1%.

J. Lafond showed a summary of the alternatives under consideration. All alternatives include a pavement overlay because a recent paving project skipped this section. J. Lafond explained that the design team had been pursuing replacement of the culvert with a 12' by 8' concrete box with baffles. This design would have included storm water treatment and full box reconstruction of US Route 302 in the project area to address drainage issues. The design included sheet piles on the outlet side near the Antique/Transmission Shop (White Mountain). Borings were needed to check constructability due to debris in the area. Also, due to the use of the property, it was determined to be prudent to check for contamination. The results of sampling found that both groundwater and soil exceeded standards. Soil and groundwater removed from the site would likely need to be taken away as solid waste or potentially the groundwater from dewatering could be treated. Either way, the cost of the project would increase significantly. Also, there is liability if the project activities were to cause the contamination to be mobilized.

The Design team informed the Front Office of the contamination and associated increase in project cost. The Front Office indicated that the team should explore rehabilitation options. The team is exploring a geopolymer lining with roughness to control water velocities and slipline options. The slip line options include plastic and steel. The plastic would significantly increase the velocity of water through the stream, and so, will not be pursued. The geopolymer spray on liner and the steel slip line would not significantly alter the velocities. The geopolymer is still fairly new (has not been used in NH to date), so the team would prefer to proceed with a corrugated metal slip line that would likely be 54 inches in diameter. The actual size of the liner will be dependent upon what is available and recommended by the suppliers. A 54" corrugated metal slip line would pass the 100 year storm. The impacts at the outlet, where the contamination was found, would be minimal. The team may try to create a pool or pad at the outlet to reduce the perch. The Department's Bridge Design Bureau will assist with the design parameters.

The group discussed the concrete retaining walls at the inlet. The walls would be replaced with updated and more stable walls. T. Reynolds explained that if it works with the design, the retaining walls would be shorter in length and shorter in height. M. Urban inquired if the wall replacement were in kind, would it be okay not to mitigate? L. Sommer agreed that mitigation for the retaining walls would not be necessary.

J. Lafond described that the slipline would require 100 linear feet of bank impacts and 450 square feet of stream impacts. J. Lafond shared the stream crossing assessment recommendations and explained that this design would not meet all of the recommendations. The design probably will encounter groundwater at the inlet. J. Lafond showed a slide describing the contamination concerns. R. Martin and J. Lafond described the soil exceedances including PAHs, lead and mercury and the groundwater exceedances including VOCs and heavy metals. Managing impacted soils and groundwater would be very expensive and expose the Department to liability if any

contaminants were mobilized. T. Reynolds commented that boring will probably be necessary at the inlet. The amount of excavation at the inlet may need to be scaled back depending on the outcome of any sampling conducted. R. Martin explained that the site is dual listed in NH DES OneStop for oil and hazardous waste. NH DES will be sending a letter to the owner of White Mountain Transmission and will copy DOT soon. The letter is anticipated to include instructions to the property owner. L. Sommer would like to hear what is recommended to the property owner. The project area is not considered by the USFWS to be potential habitat for the Northern Long-eared Bat. It is also too developed to serve as habitat for the Canada Lynx. The NHB database did not have any species occurrences indicated. The group discussed fish passage. R. Martin explained that in the NH Aquatic Resource mapper the crossing downstream has full aquatic organism passage (AOP), and the upstream crossing is a perched concrete box with no AOP. The NH Aquatic Resource Mapper indicates that Barrett Brook is a 'DES Predicated Coldwater Fishery Habitat'.

John Magee suggested that the Bureau of Environment consider the Coffman Thesis Models to determine if fish passage is likely a possibility for a pipe of this length and slope. The Design team will need to supply an estimate of the perch that will result from the slipline (reducing diameter) and design options for the structure outlet. J. Magee commented that at some point of length and slope (7% was referenced as a tipping point) fish cannot pass through a structure. Mark Hemmerlein inquired about the grout between the existing structure and the slipline. T. Reynolds explained flowable fill may be used, but the design has not progressed to this point yet. Lori Sommer asked that the perch be revisited at a future meeting. L. Sommer inquired if the flowable fill can address the sink hole/failures. T. Reynolds explained that it can. G. Infascelli explained that this design does not meet the stream crossing rules. He expressed understanding that this is a difficult situation. G. Infascelli and L. Sommer are trying to be logical and consider what is feasible. The Design team will continue to pursue the design of the corrugated metal slipline and will plan to return to another Natural Resource Agency Coordination meeting to discuss when the design has progressed and more is known about how DES will be addressing the contamination on the White Mountain Transmission site.

Follow-up items:

***After the meeting John Magee checked the fish survey database and found that wild brook trout, slimy sculpin and blacknose dace were caught at a site downstream at Cherry Valley Road, so he would expect that all three species are likely to be at the culvert in question under US Route 302.

***John Magee also ran the numbers for the culvert at 175 feet in length (= 53.3m) and a slope of 4.1% through the Coffman coarse filters. All scenarios below assume no outlet perch and no sediment throughout the proposed pipe.

1. For Model A (basically adult brook trout): $53.3 \times 4.1 = 217.3$. That is roughly in the middle of the indeterminate category that ranges from 50-600 (meaning, we can't be sure if it is passable or not passable).
2. For Model B (baby trout and minnows such as blacknose dace in streams in this part of the stream): 217.3 is predicted to be not passable.
3. For Model C (slimy sculpin in this stream): 217.3 is predicted to be not passable.

If there is a perch on the outlet, then it pushes Model A closer to not passable (but again, it is in roughly the middle of the indeterminate category). If the perch is eliminated, then it is possible that adult brook trout will be able to swim upstream through the proposed pipe. However, even if there is no perch on the outlet, the culvert will not be passable to any other fish species.

This project has been previously discussed at the 5/20/2015 and 11/16/2016 Monthly Natural Resource Agency Coordination Meetings.

BUREAU OF ENVIRONMENT CONFERENCE REPORT

SUBJECT: NHDOT Monthly Natural Resource Agency Coordination Meeting

DATE OF CONFERENCE: May 16, 2018

LOCATION OF CONFERENCE: John O. Morton Building

ATTENDED BY:

NHDOT

Sarah Large
Ron Crickard
Mark Hemmerlein
Tom Jamison
Hans Weber
Josh Lafond
Rebecca Martin
Stephanie Micucci
Tobey Reynolds

ACOE

Mike Hicks

US Coast Guard – Bridges

Jim Rousseau

NHDES

Gino Infascelli

Lori Sommer

NHF&G

Carol Henderson

NH Natural Heritage

Bureau

Amy Lamb

Consultants/Public

Participants

Darren Benoit

Jenn Riordon

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PRESENTATIONS/ PROJECTS REVIEWED THIS MONTH: *(minutes on subsequent pages)*

Finalization of April 18, 2018 Natural Resource Agency Meeting Minutes.....	2
Brookline, #41364 (X-A004(607)).....	2
Epsom-Chichester-Pittsfield-Barnstead, #41613 (X-A004(701))	2
Bethlehm, #26763 (X-A004(296))	4

(When viewing these minutes online, click on a project to zoom to the minutes for that project)

Portions of NH Route 28 are mapped as 100-year floodplain and the floodway for the Suncook River is adjacent to the project corridor in several areas. The culvert slip line area is located at the edge of a Zone AE floodplain. The only impact anticipated would be the small amount of stone placed at the culvert outlet.

Gino asked how large the drainage area is for the culvert to be slip lined. Hans said that he thought it is less than 200 acres. Lori said that she did not see the need for wetland mitigation at this point. [Jenn later looked at the USGS Stream Stats website and the culvert does not show up on the USGS stream layer. The two adjacent streams have watersheds of 38 and 64 acres. Hans confirmed later that the drainage area for the 24" culvert is less than 200 acres.]

Carol mentioned potential brook floater impacts at the slip line location. Jenn said that the stream there is very small (1 to 2 feet wide) and appears to be intermittent, so it is unlikely that brook floater would be present.

This project has not been previously discussed at a Monthly Natural Resource Agency Coordination Meeting.

Bethlehem, #26763 (X-A004(296))

The proposed project will address a culvert under Main Street (US Route 302) between Maple Street (NH Route 142) and Congress Road in Bethlehem. The project had been reviewed previously and the Design team returned last month to update the agencies on a modification to the design. The stream through the structure is a tributary to Barrett Brook. Josh Lafond explained that there is a lot of impervious surface in the project area. NH Route 302 through this area has 12 foot lanes and 4 foot shoulders. Near the culvert the paved shoulders are wider, approximately 10 feet wide. He described that the culvert goes under a local business parking lot.

J. Lafond explained that the culvert is made up of several different materials. J. Lafond explained that the original culvert is stone masonry (from the early 1900s), the inlet addition is concrete, and the outlet addition is a steel arch pipe. J. Lafond described that the outlet is near the Bethlehem Visitor Center and Heritage Society building and the outlet is near the Maya Papaya and White Mountain Transmission shops.

J. Lafond described the poor condition of the structure including the currently perched condition of the outlet. The current project design proposes to eliminate the perch. There have been multiple failures (sink holes) over the last few years. J. Lafond showed photos of the winter collapse of a catch basin, a sink hole, and the failing upstream concrete retaining walls at the culvert inlet. The inlet concrete retaining walls are proposed to be replaced in kind (same height and length) and are being designed by the Bridge Design Bureau. J. Lafond showed the slope lines outside of the concrete walls and the conceptual profiles that have been developed. The height of the replacement walls will be 4.5 feet to 5 feet. The slopes will be fairly shallow. If the walls were to be removed, the slopes would need to be cut back a significant distance, which would impact surrounding properties. The area will be disturbed during construction, but once construction is complete, the area will be graded to mimic existing slopes. The Design team is avoiding impacts to the brick memorial pavers. The contract will include an exploratory item. The design team does not believe the sewer line will be impacted.

J. Lafond showed sketches of the potential design of the retaining walls including replacing the streambed with simulated stream bed materials. He explained that the Design team is hoping to have separate walls and footings. Bridge Design will supply the requirements for the walls' toes and heels. If the toes would come to within 2 feet of each other (the channel is 5 feet wide) the design will most likely connect the two walls (3 sided box), which would be more stable. If the walls were connected, the heels could be smaller. In either scenario, simulated streambed materials are intended.

J. Lafond showed pictures from inside the culvert. The DOT District had informed the design team that this culvert requires a lot of maintenance. At the outlet, the pipe is steel and has corroded and separated. In April of 2018 another sink hole developed over a trunk line, which DOT District forces repaired. J. Lafond explained that the trunk lines are old and are made of clay. The project proposes to include repairs of the trunk lines where they attach to the culvert.

The Design team is planning to return to explain the scope and design changes to the Town of Bethlehem.

The group discussed that the slip line will be structurally sound, meaning it will be able to hold the weight of the road above, without depending on the existing structure. J. Lafond explained that the entire length of the culvert will be slip lined and some type of grout will be used between the existing structure and the slip line.

J. Lafond also commented that the new design will be primarily constructed from the culvert inlet with some minor digging for the trunk lines. J. Lafond showed graphics of the proposed slipline. The slipline proposed if a tunnel liner corrugated pipe that comes in sections. Most of the slipline would be an underpass shape. The first 30 feet from the inlet is smaller and so this section might be elliptical High-density polyethylene pipe to provide the most hydraulic area. This would be attached to the underpass shaped pipe. The overall velocities will be similar to the existing.

S. Large commented that strong swimmers (adult salmonids) will be able to use the pipe after construction since the perch will be removed. The corrugation helps control the velocity. To eliminate the perch without excavating, the design proposes to back up the area with stone (simulated stream material). The Project manager decided not to create a pool due to potential liability issues. The stone/simulated streambed fill area to eliminate the perch will be 25 feet long with a 4% slope, which matched the pipe slope. J. Lafond showed a cross section at the outlet of the pipe. There will need to be more material added closer to the pipe and less material further from the pipe. The pipe outlet will be flush with the simulated streambed material.

The group discussed how far the simulated streambed would extend up the banks of the stream. J. Lafond explained it is a Tier 2. L. Sommer indicated mitigation will be required for the 25 foot length for both banks and the channel of the stream. G. Infascelli explained that by approving the permit, the Wetlands Bureau is confirming that the design will improve the existing crossing, even though it will not comply with the stream crossing rules. L. Sommer agreed that since the channel through the pipe is already impacted, no mitigation is needed for the stream through the pipe. Also, since the retaining walls are being replaced in kind, mitigation will not be required at the inlet. J. Lafond explained that there will be some temporary impacts to impound water. The group discussed the need to mix fines in with the simulated streambed material so that the stream does not disappear below the bottom of the channel. The sizing of the material will need to be a balance. G. Infascelli explained that there should be monitoring and a plan for repairs included in the application. T. Reynolds suggested stockpiling the removed material and putting back as much as possible. G. Infascelli suggested putting it back in the same order it is removed. L. Sommer indicated that the wetland plans should clearly specify that the design will replace the stream characteristics.

The group discussed that the contamination appears to be concentrated on the outlet side of the pipe. There are not concerns about replacing the retaining walls on the inlet side. Construction is planned for summer of 2019.

This project has been previously discussed at the 5/20/2015, 11/16/2016, 3/21/2018 Monthly Natural Resource Agency Coordination Meetings.

Bethlehem 26763

Mitigation Summary

The proposed project is located on US Route 302 in the Town of Bethlehem. The proposed project consists of rehabilitating the deteriorating culvert carrying a Tier 2 unnamed tributary to Barrett Brook. The work will consist of installing a slip line rehabilitation. The Department will also be completing repairs to the upstream retaining walls.

As discussed at the May 16th Natural Resource Agency Meeting this proposed impacts (30LF) associated with the retaining wall repairs will not require mitigation. However, the project will require mitigation for the remaining channel and bank impacts. These impacts consist of 29 LF permanent impacts to bank left, 23 LF of permanent impacts to bank right, and 25 LF of permanent impacts to the channel.

As such, the Department is proposing a single and onetime payment into the Aquatic Resource Mitigation Fund (ARM-Fund) in the amount of \$18,868.08.

**DES AQUATIC RESOURCE MITIGATION FUND
STREAM PAYMENT CALCULATION**

INSERT LINEAR FEET OF IMPACT on BOTH BANKS AND CHANNEL		
	Right Bank	23.00
	Left Bank	29.0000
	Channel	25.0000
	TOTAL IMPACT	77.0000
	Stream Impact Cost:	\$15,723.40
	DES Administrative cost:	
		\$3,144.68
***** TOTAL ARM FUND STREAM PAYMENT*****		
		\$18,868.08

Bethlehem, #26763

Region ID:
Workspace ID:
Clicked Point (Latitude, Longitude):
Time:

NH
NH20180529143153467000
44.28042, -71.68579
2018-05-29 10:32:08 -0400



Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	0.88	square miles

USGS Data Disclaimer: Unless otherwise stated, all data, metadata and related materials are considered to satisfy the quality standards relative to the purpose for which the data were collected. Although these data and associated metadata have been reviewed for accuracy and completeness and approved for release by the U.S. Geological Survey (USGS), no warranty expressed or implied is made regarding the display or utility of the data for other purposes, nor on all computer systems, nor shall the act of distribution constitute any such warranty.

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Application Version: 4.2.1

**NH Department of Transportation
Bureau of Highway Design
Bethlehem, 26763**

Env-Wt 904.06 Repair or Rehabilitation of Tier 1 or Tier 2 Existing Legal Crossings

- In order to qualify under this section, the crossing cannot have a history of causing or contributing to flooding that damages the crossing or other infrastructure. Does the crossing have a history of flooding? **The existing structure does not have a history of flooding.**
- Repair or rehabilitation pursuant to this section may be accomplished by concrete repair, slip lining, cured-in-place lining, or concrete invert lining. Please describe how this applies to the subject project.

The project will consist of slip lining the existing box culvert with 30 LF of 48" x 59" Elliptical HDPE at the inlet of the structure and 145 LF of 51" x 69" Elliptical Tunnel Liner Plate Corrugated Metal Pipe for the remainder of the culvert.

If the above criteria do not apply to this project, the crossing does not qualify under this section and must be designed according to 904.02 (Tier 1 crossings) or 904.05 (Tier 2 crossings).

If the above criteria apply to this project, please provide the following information.

The project may qualify as a **minimum** impact project if:

The crossing does not diminish the hydraulic capacity of the crossing. The proposed slip lining will slightly reduce the hydraulic capacity due to the change in the shape of the culvert after the slip lining is constructed. However, the proposed culvert is not anticipated to reach its full capacity in the 100-year storm event or overtop/cause flooding.

The crossing does not diminish the capacity of the crossing to accommodate aquatic life passage. The scope of work includes addressing the perched outlet of the structure to improve connectivity and aquatic organism passage. Based on the slope (average of 4% grade) and length of the crossing only adult salmonids are currently able to pass through the existing structure. Once the slip lining rehabilitation is complete the structure will have comparable velocities to existing due to the material and corrugation of the slip lining liner and the slope of the structure will remain the same. It was determined in and subsequent to the March 21, 2018 Natural Resource Agency meeting that the strong adult salmonids currently using the crossing would be able to continue to use the crossing.

The crossing meets the general design criteria specified in Env-Wt 904.01, as follows:

Env-Wt 904.01

(a) Not be a barrier to sediment transport;

Sediment will continue to be transported similar to existing conditions.

(b) Prevent the restriction of high flows and maintain existing low flows;

The proposed slip lining has been designed for the 100 year storm event. The culvert will not reach full capacity during the 100 year storm event. Corrugated Metal Tunnel Plate Liner will be installed for a majority of the culvert and will produce a flow velocity similar to the existing conditions. Low flows will remain similar to those conditions that exist today during low flow periods.

(c) Not obstruct or otherwise substantially disrupt the movement of aquatic life indigenous to the waterbody beyond the actual duration of construction; The existing perch at the outlet of the culvert will be addressed during construction with channel modifications using simulated stream bed material to match the invert of the structure's outlet to allow any fish passage that may possibly occur in the stream. Based on the slope (average of 4% grade) and length of the crossing only adult salmonids are currently able to pass through the existing structure. Once the slip lining rehabilitation is complete the structure will have comparable velocities to existing due to the material and corrugation of the slip lining liner and the slope of

the structure will remain the same. It was determined in and subsequent to the March 21, 2018 Natural Resource Agency meeting that the strong adult salmonids currently using the crossing would be able to continue to use the crossing.

(d) Not cause an increase in the frequency of flooding or overtopping of banks;
The hydraulic model for the 100 year storm event does not indicate that the culvert will be at full capacity, and therefore flooding should not increase.

(e) Preserve watercourse connectivity where it currently exists;
The existing outlet is perched approximately 12 inches.

(f) Restore watercourse connectivity where: (1) Connectivity previously was disrupted as a result of human activity(ies); and(2) Restoration of connectivity will benefit aquatic life upstream or downstream of the crossing, or both;
The modification to the channel at the outlet of the existing culvert will improve connectivity of the stream that will benefit aquatic life by eliminating the perched outlet.

(g) Not cause erosion, aggradation, or scouring upstream or downstream of the crossing; and
The project will maintain the existing stream and culvert alignment. The hydraulic model for the 100 year storm event shows flow velocities similar to the existing conditions; therefore no change in erosion, aggradation, or scouring conditions are anticipated. Streambed material will be placed into the streambed at the existing elevation to stabilize slopes up and downstream as well as to prevent erosion at the inlet and outlet of the structure.

(h) Not cause water quality degradation.
The project will utilize a Clean Water Bypass during construction and all standard DOT Best Management Practices. The existing impervious area will not be increased as part of the proposed project, and therefore the contributing roadway runoff to the stream will remain the same.

If the project does not qualify as a minimum impact project due to reasons stated above, it may qualify as a **minor** impact project if:

The crossing does not adversely impact the stability of the stream banks or stream bed upstream or downstream of the crossing.

The crossing does not cause an increase in the frequency of flooding or overtopping of banks.

If the project does not meet the above criteria for minimum OR minor, the crossing does not qualify under this section and must be designed according to 904.02 (Tier 1 crossings) or 904.05 (Tier 2 crossings).



New Hampshire Natural Heritage Bureau

To: Rebecca Martin
7 Hazen Drive
PO Box 483
Concord, NH 03302

Date: 3/14/2018

From: NH Natural Heritage Bureau

Re: Review by NH Natural Heritage Bureau of request dated 3/14/2018

NHB File ID: NHB18-0856

Applicant: Rebecca Martin

Location: Tax Map(s)/Lot(s):
Bethlehem

Project Description: 26763: The project will address a culvert under US Route 302 (Main Street) between Congress Road and Maple Street. The existing culvert is perched and has been added on to over time, beginning as a mortared stone box, with a formed concrete box added to the inlet and an elliptical corrugated metal pipe added to the outlet end. The existing culvert is approximately 5 feet wide and 7.5 feet tall. The culvert regularly requires repair. The culvert will most likely be rehabilitated. There are failing concrete retaining walls on the inlet of the culvert that will need to be addressed as part of the project.

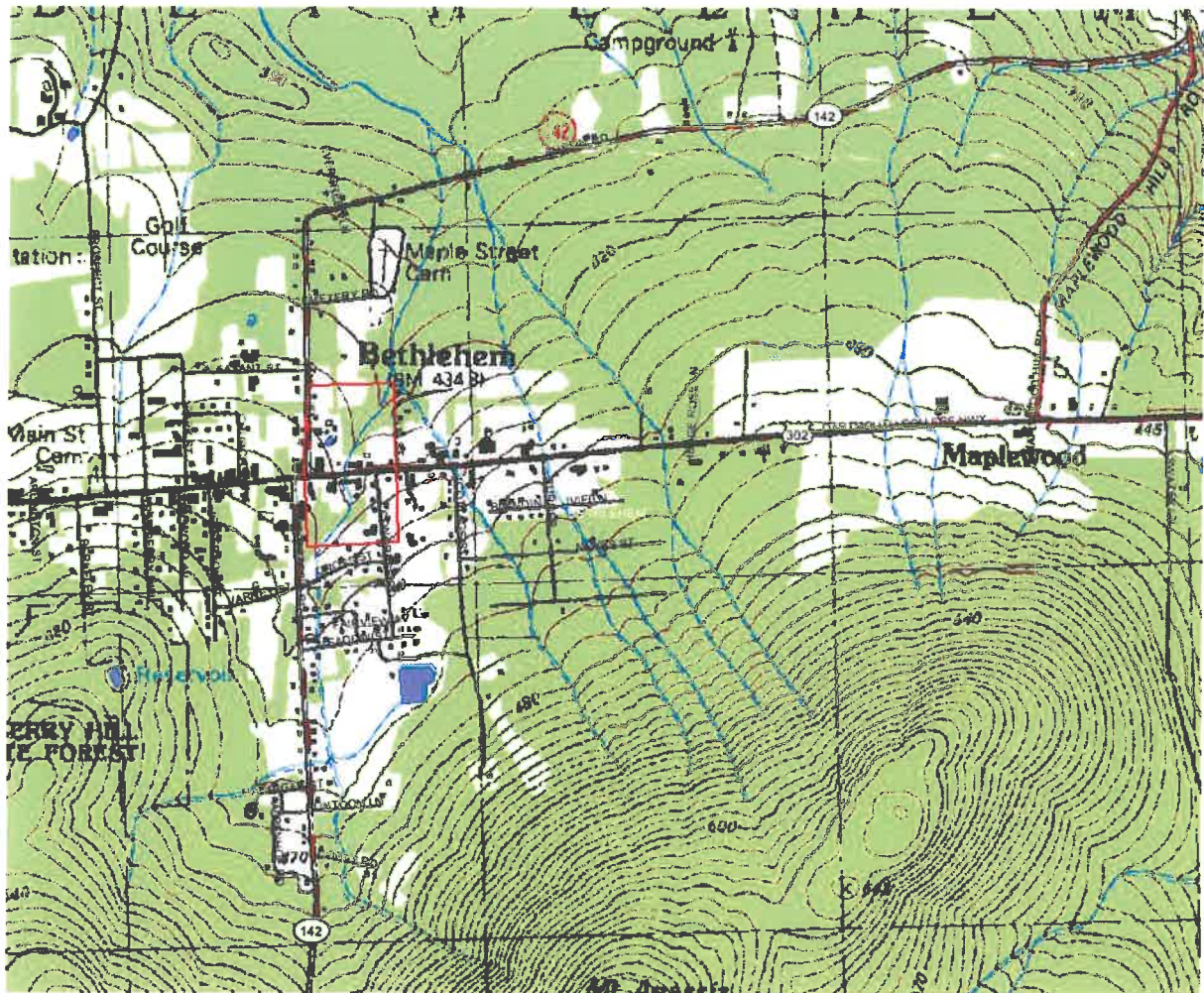
The NH Natural Heritage database has been checked for records of rare species and exemplary natural communities near the area mapped below. The species considered include those listed as Threatened or Endangered by either the state of New Hampshire or the federal government. We currently have no recorded occurrences for sensitive species near this project area.

A negative result (no record in our database) does not mean that a sensitive species is not present. Our data can only tell you of known occurrences, based on information gathered by qualified biologists and reported to our office. However, many areas have never been surveyed, or have only been surveyed for certain species. An on-site survey would provide better information on what species and communities are indeed present.

This report is valid through 3/13/2019.



MAP OF PROJECT BOUNDARIES FOR NHB FILE ID: NHB18-0856





United States Department of the Interior



FISH AND WILDLIFE SERVICE
New England Ecological Services Field Office
70 COMMERCIAL STREET, SUITE 300
CONCORD, NH 03301
PHONE: (603)223-2541 FAX: (603)223-0104
URL: www.fws.gov/newengland

Consultation Code: 05E1NE00-2017-SLI-0758

February 02, 2017

Event Code: 05E1NE00-2017-E-01305

Project Name: Bethlehem 26763

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

<http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF>

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (<http://www.fws.gov/windenergy/>) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm>; <http://www.towerkill.com>; and <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html>.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment



United States Department of Interior
Fish and Wildlife Service

Project name: Bethlehem 26763

Official Species List

Provided by:

New England Ecological Services Field Office
70 COMMERCIAL STREET, SUITE 300
CONCORD, NH 03301
(603) 223-2541
<http://www.fws.gov/newengland>

Consultation Code: 05E1NE00-2017-SLI-0758

Event Code: 05E1NE00-2017-E-01305

Project Type: TRANSPORTATION

Project Name: Bethlehem 26763

Project Description: The project proposes replacement of a culvert under US Route 302 and associated road reconstruction project located on US Route 302 between Maple Street (NH Route 142) and Congress Street in Bethlehem, New Hampshire. Specifically, the proposed improvements include, but may not be limited to:

- Reconstruction of the culvert, including lengthening of the structure with flattening the roadway embankment slope to 2:1 above the culvert outlet.
- Formalization of the drive entrances and parking at Maia Papaya/Post Office and Town Hall/Fire Department to improve safety and egress by Emergency vehicles.
- Reconstruction of US Route 302 (full box) through the project area and new trunk lines to collect storm water and deposit into the culvert with new catch basins.
- Lowering of the US Route 302 roadway profile by one foot to accommodate positive drainage to the roadway from adjacent properties. Total excavation will be approximately 4 feet deep; and
- A possible location for a stormwater treatment area is being considered behind the Maia Papaya/Post Office building

Please Note: The FWS office may have modified the Project Name and/or Project Description, so it may be different from what was submitted in your previous request. If the Consultation Code matches, the FWS considers this to be the same project. Contact the office in the 'Provided by' section of your previous Official Species list if you have any questions or concerns.



United States Department of Interior
Fish and Wildlife Service

Project name: Bethlehem 26763

Project Location Map:



Project Coordinates: MULTIPOLYGON (((-71.68783807806905 44.28062870108253, -71.68773508150481 44.28008795016601, -71.68642187105435 44.27924301718836, -71.68465161375936 44.27921843751309, -71.6839756970876 44.28028458765185, -71.68340921532945 44.28053038323211, -71.68354654364522 44.280874495223195, -71.68464517671966 44.280935943597676, -71.68428683267848 44.28194676018079, -71.68546271350353 44.28209576937702, -71.68649053586707 44.2821218845887, -71.68730592806243 44.2808867847157, -71.68773508150481 44.28084991576163, -71.68783807806905 44.28062870108253)))

Project Counties: Grafton, NH



United States Department of Interior
Fish and Wildlife Service

Project name: Bethlehem 26763

Endangered Species Act Species List

There are a total of 2 threatened or endangered species on your species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Critical habitats listed under the **Has Critical Habitat** column may or may not lie within your project area. See the **Critical habitats within your project area** section further below for critical habitat that lies within your project. Please contact the designated FWS office if you have questions.

Mammals	Status	Has Critical Habitat	Condition(s)
Canada Lynx (<i>Lynx canadensis</i>) Population: Contiguous U.S. DPS	Threatened	Final designated	
Northern long-eared Bat (<i>Myotis septentrionalis</i>) Population: Wherever found	Threatened		



United States Department of Interior
Fish and Wildlife Service

Project name: Bethlehem 26763

Critical habitats that lie within your project area

There are no critical habitats within your project area.

STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION
BUREAU OF ENVIRONMENT

NOTE TO FILE

Date: September 10, 2015

From: Rebecca Martin
Environmental Manager
Bureau of Environment

RAM

Subject: Bethlehem 26763
Concord 16287
Concord 16288

RE: Northern Long-Eared Bats

The proposed projects involve limited clearing in order to complete culvert replacements or rehabilitations. The advertising dates and/or completion dates for these projects make them ineligible for clearing during the inactive season in accordance with the time-of-year restrictions identified in the USFWS New England Regional Field Office time of year restriction letter signed by Thomas Chapman and dated July 7, 2015.

The 26763 Bethlehem project involves replacement of the culvert that passes under Route 302, the outlet of the culvert will be extended approximately 20 feet, and limited clearing will be required to access the site and replace the culvert. The 16287 Concord project involves sliplining two pipes on Interstate 393. Access locations for this work are still being determined, but limited clearing will be required to access the culverts to complete the sliplining. The 16288 Concord project involves rehabilitation or sliplining of an existing culvert on Interstate 393 and limited clearing will be required to access the culvert to complete the necessary work.

The Northern Long-Eared Bat (NLEB) (*Myotis septentrionalis*) has been listed under the Endangered Species Act (ESA). According to USFWS, "take" is defined as any action to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such activity" or "significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavior patterns, including breeding, feeding or sheltering." NHDOT activities are reviewed for impacts to NLEB with guidance provided by USFWS New England Field Office.

The number of trees and area proposed for clearing to accomplish the proposed culvert projects is of such a limited nature, that even with clearing during the NLEB active season, the projects' impacts to NLEB and NLEB habitat will have insignificant or discountable effects on the species. With the recent prevalence of white-nose syndrome in the Northeast, bat numbers are exceedingly low in the region. As was cited in the ESA listing of the NLEB, data from surveys of hibernacula and summer surveys have demonstrated a dramatic decline (99 percent) in NLEB numbers compared to numbers of NLEB detected prior to White Nose Syndrome infecting bats in NH, according to information provided by the New Hampshire Fish and Game Department. Also, in research conducted in New Hampshire in 2012, Yates et al. found that NLEB in their study selected closed canopy forests for their day roosts with canopy cover and closure averages both measuring over 95%. This preference for closed canopy forests would limit the likelihood that construction in more open areas would directly impact NLEB.

Susi von Oettingen, a USFWS Endangered Species Biologist in the New England Field Office, reviewed the areas that will be impacted by these three projects and the proposed project activities. In a telephone conversation between Rebecca Martin and Susi von Oettingen on August 3rd, 2015, Susi von Oettingen indicated that these projects (26763 Bethlehem, 16287 Concord, and 16288 Concord) will have "No Effect" on NLEB. Susi von Oettingen based her determination on the lack of suitable NLEB habitat in the project areas.

For these reasons, it was determined that the proposed project will result in "No Effect" on NLEB and no further coordination with USFWS is necessary. If the scope of work changes or the Contractor proposes work in areas that have not been reviewed, the Bureau of Environment shall be notified prior to the commencement of construction.

MEMORANDUM OF AGREEMENT

**AMONG NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION,
FEDERAL HIGHWAY ADMINISTRATION,**

and the

NEW HAMPSHIRE STATE HISTORIC PRESERVATION OFFICER

**Regarding the BETHLEHEM, X-A004(296), 26763 project with plans to slipline a culvert located under
US Route 302.**

WHEREAS, the Federal Highway Administration (FHWA) plans to provide funds for the New Hampshire Department of Transportation (NHDOT) to slipline a culvert in the town of Bethlehem, New Hampshire; and

WHEREAS, the undertaking consists of sliplining the hybrid steel arch, stone box and concrete box culvert located under US Route 302 between Congress Road and Maple Street; and

WHEREAS, FHWA has determined that the undertaking will have an adverse effect on the Bethlehem Historic District which is eligible for listing in the National Register of Historic, of which the culvert is a contributing feature due to the irreversible installation of the sliplining, and has consulted with the NHDOT and the New Hampshire State Historic Preservation Officer (SHPO) pursuant to 36 C.F.R. part 800, of the regulations implementing Section 106 of the National Historic Preservation Act (54 U.S.C. § 306108); and

WHEREAS, SHPO and NHDOT agree with FHWA's finding that this undertaking is a Net Benefit under Section 4(f) due to its measures to minimize harm to the historic district; and

WHEREAS, NHDOT has reached out to the Town and other interested groups via letters and at the Public Informational Meeting to seek Consulting Party status; the Bethlehem Heritage Society has been identified; and

WHEREAS, in accordance with 36 C.F.R. § 800.6(a)(1), FHWA has notified the Advisory Council on Historic Preservation (ACHP) of its adverse effect determination with specified documentation and the ACHP has chosen not to participate in the consultation pursuant to 36 CFR § 800.6(a)(1)(iii).

NOW, THEREFORE, FHWA, NHDOT and the SHPO agree that the undertaking shall be implemented in accordance with the following stipulations in order to take into account the effect of the undertaking on historic properties.

STIPULATIONS

FHWA/NHDOT shall ensure that the following measure is carried out:

1. NHDOT will work with the Town and the Bethlehem Heritage Society to develop interpretive signage to be placed along US Route 302 in the area of the culvert to be removed and the former Bonardi Block (non-extant). The panel will focus on the history of the village's development and the importance of transportation infrastructure and water management in its development. Additional information portrayed will be the specific site history, including use of historic maps to show the development of the area.
 - a. The panel's content and material will be prepared by a 36 CFR 61-qualified architectural historian. The NH SHPO will be provided an opportunity to review one (1) draft of the panel's content with a review period of thirty (30) days. The Bethlehem Heritage Society will be provided the opportunity to review the panels content with a review period of thirty (30) days. Upon approval of the panel, it will be fabricated and installed at a location to be determined in consultation with the Town.
 - b. NHDOT will also supply the Town and the Bethlehem Heritage Society with the final digital PDF of the interpretive panel.

I. DURATION

This MOA will expire if its terms are not carried out within five (5) years from the date of its execution. Prior to such time, FHWA may consult with the other signatories to reconsider the terms of the MOA and amend it in accordance with Stipulation IV below.

II. POST-REVIEW DISCOVERIES. In the event of discovery of a previously unidentified site or human remains during project construction, the following stipulations shall be followed:

- a. If human remains are discovered during project construction, that portion of the project will stop immediately. The resident engineer shall notify the county medical examiner and the state archaeologist at NH SHPO as per RSA 227-C:8-a-II, as well as the NHDOT Cultural Resources Program Specialist/Archaeologist or Cultural Resources Program Manager so that the proper steps may be taken by these agencies to determine proper procedures and identify the appropriate notification process. Cover and protect the burial. Construction activities shall not continue until verbal notification is provided by the NHDOT. If the human remains are determined by the medical examiner to be subject to the provisions of RSA 227-C:8-b then FHWA with NHDOT and NH SHPO shall be responsible for complying with RSA 227-C:8 and NAGPRA, not the investigating archaeologist.
- b. When the burial is Native American, whether or not the group is federally recognized, RSA 227-C:8-d directs the State Archaeologist to immediately notify the leaders, officials, or spokesperson of Native American tribes or groups to determine the appropriate treatment of the burial (see also RSA 227-C:8-g). In addition, a treatment and reburial plan shall be developed in full consultation with the appropriate Native American group(s) in compliance with the requirements of NAGPRA.
- c. When the burial is not Native American, the State Archaeologist and often the NHDOT Bureau of Right of Way seek identification of descendants to determine wishes for disposition of the burial (see also RSA 227-C:8-e and 8-g). If skeletal analysis is deemed appropriate, this study shall be undertaken by a qualified analyst in consultation with the NH SHPO and NHDOT (see RSA 227-C:8-f).
- d. If unanticipated archaeological features and artifacts are discovered, that portion of the project

shall stop immediately. The resident engineer shall notify the NHDOT Cultural Resources Program Specialist/Archaeologist or Cultural Resources Program Manager and the State Archaeologist at the NH SHPO so that the proper steps may be taken by these agencies to determine proper procedures. Regulation 36 CFR 800.13 (b) states that if historic properties are located after the conclusion of the Section 106 process as "post review discoveries," for example those arising during construction, the federal agency official shall make every reasonable effort to avoid, minimize, or mitigate the effect of the project on the properties. In such situations in which the NHDOT must recover archaeological remains in a short time period and they do not involve human remains, the identified features and artifact concentrations shall be recovered following the guideline for Phase III excavations as closely as possible. Construction monitoring of the affected area may follow this recovery if the type of archaeological deposit, landscape, vegetation, and project allow this approach to be effective.

II. MONITORING AND REPORTING

Each year following the execution of this MOA until it expires, is terminated or stipulations completed, NHDOT shall provide all parties to this MOA a summary report detailing work undertaken pursuant to its terms. Such report shall include any scheduling changes proposed, any problems encountered, and any disputes and objections received in FHWA's efforts to carry out the terms of this MOA.

III. DISPUTE RESOLUTION

Should any signatory to this MOA object at any time to any actions proposed or the manner in which the terms of this MOA are implemented, FHWA shall consult with such party to resolve the objection. If the FHWA determines that such objection cannot be resolved, FHWA will:

- A. Forward all documentation relevant to the dispute, including FHWA's proposed resolution, to the ACHP. The ACHP shall provide FHWA with its advice on the resolution of the objection within thirty (30) days of receiving adequate documentation. Prior to reaching a final decision on the dispute, FHWA shall prepare a written response that takes into account any timely advice or comments regarding the dispute from the ACHP, signatories and concurring parties, and provide them with a copy of this written response. FHWA will then proceed according to its final decision.
- B. If the ACHP does not provide its advice regarding the dispute within the thirty (30) day time period, FHWA may make a final decision on the dispute and proceed accordingly. Prior to reaching such a final decision, FHWA shall prepare a written response that takes into account any timely comments regarding the dispute from the signatories and concurring parties to the MOA, and provide them and the ACHP with a copy of such written response.
- C. FHWA's responsibility to carry out all other actions subject to the terms of this MOA that are not the subject of the dispute remain unchanged.

IV. AMENDMENTS

This MOA may be amended when such an amendment is agreed to in writing by all signatories. The amendment will be effective on the date a copy signed by all of the signatories is filed with the ACHP.

V. TERMINATION

If any signatory to this MOA determines that its terms will not or cannot be carried out, that party shall immediately consult with the other parties to attempt to develop an amendment per Stipulation IV, above. If within thirty (30) days (or another time period agreed to by all signatories) an amendment cannot be reached, any signatory may terminate the MOA upon written notification to the other signatories.

Once the MOA is terminated, and prior to work continuing on the undertaking, FHWA must either (a) execute an MOA pursuant to 36 CFR § 800.6 or (b) request, take into account, and respond to the comments of the ACHP under 36 CFR § 800.7. FHWA shall notify the signatories as to the course of action it will pursue.

Execution of this MOA by FHWA, NHDOT and SHPO and implementation of its terms evidence that FHWA has taken into account the effects of this undertaking on historic properties and afforded the ACHP an opportunity to comment.

SIGNATORIES:

FEDERAL HIGHWAY ADMINISTRATION

By: 
for: Patrick A. Bauer
NH Division Administrator

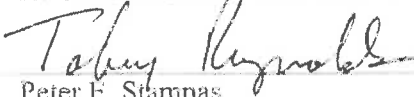
Date: 6/5/18

NEW HAMPSHIRE DIVISION OF HISTORICAL RESOURCES

By: 
Elizabeth H. Muzzey
State Historic Preservation Officer

Date: 5/21/18

NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION

By: 
for: Peter E. Stamnas
Director of Project Development

Date: 5/25/18



Victoria F. Sheehan
Commissioner

THE STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION



William Cass, P.E.
Assistant Commissioner

BETHLEHEM
X-A004(296)
26763
RPR6322

Adverse Effect Memo

Pursuant to meetings and discussions on December 8, 2016, and for the purpose of compliance with regulations of the National Historic Preservation Act, as amended, and the Advisory Council on Historic Preservation's *Procedures for the Protection of Historic Properties* (36 CFR 800), the NH Division of the Federal Highway Administration and the NH Division of Historical Resources have coordinated the identification and evaluation of historic and archeological properties with plans to improve the culvert crossing located between Congress Road and Maple Street on US. Route 302 in Bethlehem, New Hampshire.

Project Description

The proposed project includes replacement of a culvert, comprised of concrete, corrugated metal, and stone box segments, that runs under US Route 302 (Main Street) located within the Bethlehem Historic District. The project proposes to install a longer (215' proposed vs. 172' existing structure) structure, reconstruct US Route 302/Main Street (full box roadway reconstruction) through the project area, and to construct new curb line drainage to collect stormwater. The project also proposes to lower the US Route 302 roadway profile by one foot to accommodate positive drainage to the roadway from adjacent properties and to construct a stormwater treatment area, which is being considered behind the Maia Papaya/Post Office building.

At the culvert outlet the project will flatten the embankment slope to 2:1 above the culvert outlet and formalize the drive entrances and parking at Maia Papaya/Post Office and the Town Hall/Fire Department in order to improve safety and egress by emergency vehicles. At the culvert inlet there are currently failing concrete retaining walls that will be removed and the area will be graded with vegetated slopes. A modern wooden foot bridge on the Bethlehem Visitor's Center property at the inlet will be removed, but a path is intended to be constructed over the inlet to allow pedestrian access. The bridge was a gift to the Town of Bethlehem. The bridge will be relocated to the Bethlehem Visitor's Center property, but will no longer be spanning the Barrett Brook. The new structure proposed to be constructed is longer than the existing culvert, which will accommodate the pedestrian path on the Bethlehem Historical Society property and will allow flattening of the roadway embankment to a slope of 2:1 above the culvert inlet. *Impacts to the retaining wall at the culvert outlet will be avoided or minimized to avoid adverse effects to a contributing blacksmith shop.*

Analysis

Based on a review pursuant to 36 CFR 800.4 of the architectural and/or historical significance of resources in the project area, we agree that the Bethlehem Historic District is eligible for listing on the National Register of Historic Places. We also agree that the stone box and concrete culvert located under US Route 302 is a contributing element to the Bethlehem Historic District. A detailed description of the resource is on file at the New Hampshire Division of Historical Resources in Concord, New Hampshire.

Public Consultation

Initial contact letters were sent to interested parties and abutting property owners in May and June 2016. A Public Information meeting was held on January 9, 2017. No consulting parties have been identified to date, however the Bethlehem Heritage Commission has expressed interest in the mitigation efforts.

Determination of Effect

Applying the criteria of effect at 36 CFR 800.5, we have determined that the project will have an adverse effect on the Bethlehem Historic District, due to the removal and replacement of the stone box, corrugated metal, and concrete culvert located under US Route 302, adjacent to the Maia Papaya/Post Office building.

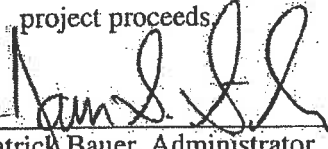
Mitigation Measures

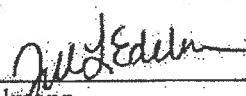
All mitigation measures will be recorded in a Section 106 Memorandum of Agreement (MOA). Working with the Town of Bethlehem and the Bethlehem Heritage Commission, the NHDOT is proposing to install interpretive signage discussing the importance of transportation infrastructure to the Bethlehem Historic District and relating to the site of the proposed culvert replacement. The history of the site will also be discussed, as historic maps of the project area show that a building (the Bonardi Block) once spanned over the culvert south of US Route 302 (Main Street).

All necessary phases of archaeology will be completed prior to any ground disturbance. Should an archaeological site determined eligible for the National Register of Historic Places, be adversely impacted, the signatories to this memo and any subsequent MOA will discuss updating the effect finding and any necessary mitigation measures.

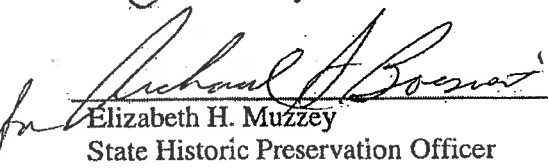
Section 4(f) (to be completed by FHWA)	There Will Be:	<input type="checkbox"/> No 4(f);	<input type="checkbox"/> Programmatic 4(f);	<input checked="" type="checkbox"/> Full 4 (f); or
	<input type="checkbox"/> A finding of <i>de minimis</i> 4(f) impact as stated: In addition, with NHDHR concurrence of no adverse effect for the above undertaking, and in accordance with 23 CFR 774.3, FHWA intends to, and by signature below, does make a finding of <i>de minimis</i> impact. NHDHR's signature represents concurrence with both the no adverse effect determination and the <i>de minimis</i> findings. Parties to the Section 106 process have been consulted and their concerns have been taken into account. Therefore, the requirements of Section 4(f) have been satisfied.			

In accordance with the Advisory Council's regulations, consultation will continue, as appropriate, as this project proceeds.


Patrick Bauer, Administrator
Federal Highway Administrator
Date 5/4/17


Jill Edelmann
Cultural Resources Manager
Date 5/4/2017

Concurred with by the NH State Historic Preservation Officer:


Elizabeth H. Muzzey
State Historic Preservation Officer
NH Division of Historical Resources
Date 5-4-17

c.c. Jamie Sikora, FHWA
Christine St. Louis, NHDHR

Victoria Chase, NHDOT
Rebecca Martin, NHDOT

s:\environment\projects\bethlehem\26763\cultural\adverseeffectfhwa.docx.



**US Army Corps
of Engineers**
New England District

**U.S. Army Corps of Engineers
New Hampshire Programmatic General Permit (PGP)
Appendix B - Corps Secondary Impacts Checklist
(for inland wetland/waterway fill projects in New Hampshire)**

1. Attach any explanations to this checklist. Lack of information could delay a Corps permit determination.
2. All references to “work” include all work associated with the project construction and operation. Work includes filling, clearing, flooding, draining, excavation, dozing, stumping, etc.
3. See PGP, GC 5 regarding single and complete projects.
4. Contact the Corps at (978) 318-8832 with any questions.

1. Impaired Waters	Yes	No
1.1 Will any work occur within 1 mile upstream in the watershed of an impaired water? See http://des.nh.gov/organization/divisions/water/wmb/section401/impaired_waters.htm to determine if there is an impaired water in the vicinity of your work area.*		x
2. Wetlands	Yes	No
2.1 Are there are streams, brooks, rivers, ponds, or lakes within 200 feet of any proposed work?	x	
2.2 Are there proposed impacts to SAS, shellfish beds, special wetlands and vernal pools (see PGP, GC 26 and Appendix A)? Applicants may obtain information from the NH Department of Resources and Economic Development Natural Heritage Bureau (NHB) website, www.nhnaturalheritage.org , specifically the book Natural Community Systems of New Hampshire .		x
2.3 If wetland crossings are proposed, are they adequately designed to maintain hydrology, sediment transport & wildlife passage?	x	
2.4 Would the project remove part or all of a riparian buffer? (Riparian buffers are lands adjacent to streams where vegetation is strongly influenced by the presence of water. They are often thin lines of vegetation containing native grasses, flowers, shrubs and/or trees that line the stream banks. They are also called vegetated buffer zones.)	x Will re-vegetate	
2.5 The overall project site is more than 40 acres.		x
2.6 What is the size of the existing impervious surface area?		
2.7 What is the size of the proposed impervious surface area?		
2.8 What is the % of the impervious area (new and existing) to the overall project site?		
3. Wildlife	Yes	No
3.1 Has the NHB determined that there are known occurrences of rare species, exemplary natural communities, Federal and State threatened and endangered species and habitat, in the vicinity of the proposed project? (All projects require a NHB determination.)		x NHB18-0856
3.2 Would work occur in any area identified as either “Highest Ranked Habitat in N.H.” or “Highest Ranked Habitat in Ecological Region”? (These areas are colored magenta and green, respectively, on NH Fish and Game’s map, “2010 Highest Ranked Wildlife Habitat by Ecological Condition.”) Map information can be found at: • PDF: www.wildlife.state.nh.us/Wildlife/Wildlife_Plan/highest_ranking_habitat.htm . • Data Mapper: www.granit.unh.edu . • GIS: www.granit.unh.edu/data/downloadfreedata/category/databycategory.html .		x
3.3 Would the project impact more than 20 acres of an undeveloped land block (upland, wetland/waterway) on the entire project site and/or on an adjoining property(s)?		x
3.4 Does the project propose more than a 10-lot residential subdivision, or a commercial or industrial development?		x
3.5 Are stream crossings designed in accordance with the PGP, GC 21?	x	

4. Flooding/Floodplain Values	Yes	No
4.1 Is the proposed project within the 100-year floodplain of an adjacent river or stream?		x
4.2 If 4.1 is yes, will compensatory flood storage be provided if the project results in a loss of flood storage?		n/a
5. Historic/Archaeological Resources		
If a minor or major impact project, has a copy of the Request for Project Review (RPR) Form (www.nh.gov/nhdhr/review) been sent to the NH Division of Historical Resources as required on Page 5 of the PGP?**	x	

*Although this checklist utilizes state information, its submittal to the Corps is a Federal requirement.

** If project is not within Federal jurisdiction, coordination with NH DHR is not required under Federal law.

WETLAND PERMIT APPLICATION – PICTURES



Inlet of culvert facing upstream from foot bridge at existing retaining walls – 09/16/2015



Facing Upstream from the foot bridge towards area that visitors/ general public uses – 7/17/2014



Facing downstream towards the inlet of the structure from the foot bridge at an area that visitors/ general public uses – 7/17/2014



Facing towards the Visitor's Center from the foot bridge towards area visitors use – 7/17/2014



Inlet of culvert facing upstream from inside of the culvert – 08-21-14



Inlet of culvert facing downstream from beginning of existing retaining walls – 05-19-15



Facing downstream towards the inlet of the structure – 7/17/2014



Inlet of culvert facing downstream at beginning of existing box culvert – 08-21-14



Outlet of culvert facing upstream – 05-19-15



Outlet of culvert facing upstream – 05-19-15

Project Advertises September 4, 2018

2018 Season

No work anticipated.

2019 Season

1. Install perimeter controls and define maximum work limits for all grading and drainage work
2. Complete clearing/grubbing operations.
3. Install clean water bypass at inlet and pump through the existing culvert to the outlet during the slip lining of the culvert.
4. Remove existing retaining walls at inlet.
5. Construct staging area for culvert slip lining and prepare the existing culvert for the HDPE and Tunnel Liner Plate culverts to be installed.
6. Install 30 LF of HDPE pipe into the existing culvert from the inlet followed by of Tunnel Liner Plate.
7. Install the connection between the HDPE pipe and the Tunnel Liner Plate.
8. Begin two-way alternating one lane traffic shifting lanes to the eastbound lane. Alternating one way traffic shall only be permitted during construction hours. Traffic shall be returned to normal traffic patterns each night.
9. Remove existing trunk lines and drop inlet connection within the limits shown on the plans and install 24" HDPE in place.
10. Connect newly installed 24" HDPE trunk lines and drop inlet connection into Tunnel Liner Plate pipe slip lined into existing culvert.
11. Complete installation of Tunnel Liner Plate to the outlet of the existing culvert.
12. Construct "caps" at the inlet and the outlet of the existing culvert to seal the voids between the existing box culvert and the newly installed slip lining pipes.
13. Pump flowable fill into the voids between the existing box culvert and the newly installed slip lining pipes.
14. Construct modified channel at the outlet utilizing simulated stream bed material.
15. Construct retaining walls at the inlet into the similar footprint of the existing retaining walls previously removed.
16. Install simulated stream bed material between the constructed retaining walls.
17. Reestablish slopes with seed and humus
18. Discontinue clean water bypass
19. Cold plane operations for pavement matches at the beginning and end of the project limits
20. Overlay pavement course through project limits.

Anticipated Completion: August 2019

BETHLEHEM
26763

PART WT 404 CRITERIA FOR SHORELINE STABILIZATION

The rehabilitation of the box culvert under US Route 302 including the removal of the existing perch at the outlet proposes simulated stream bed material within areas under the jurisdiction of the NH Wetlands Bureau. The simulated streambed material will be located within the channel of the unnamed stream as shown on the plans.

Pursuant to PART Wt 404 Criteria for Shoreline Stabilization, the following addresses each codified section of the Administrative Rules:

Wt 404.01 Least Intrusive Method

The modified channel proposed with simulated streambed material is the least intrusive construction method necessary to minimize the disruption to the existing banks and embankments, stabilize the upstream retaining walls, and protection against erosion at the inlet and outlet of the structure. The Department also wanted to minimize the potential of spreading existing soil and groundwater contamination that was found within the areas adjacent to the stream. The simulated streambed material will be constructed in a fill situation only with no excavation proposed within the area of the culvert outlet. The modified channel will be constructed to eliminate the existing perch located at the outlet to accommodate fish passage.

Wt 404.02 Diversion of Water

During construction the water from the stream will be impounded upstream of the existing box culvert and pumped through the culvert. The pipe used for diverting the stream through the box culvert will be hung within the culvert during the construction process.

Wt 404.03 Vegetative Stabilization

Natural vegetation will be left undisturbed to the maximum extent possible and disturbed areas during construction will have humus and seed applied for turf establishment.

Wt 404.04 Rip-Rap

- (a) The simulated streambed material, as proposed and shown on the attached plans and channel modification is intended to remove the existing perch at the outlet of the box culvert located under US Route 302 to accommodate fish passage. The simulated streambed material is also in place to prevent erosion at the outlet and inlet of the structure as well as to aid in stabilizing the retaining walls at the inlet of the structure.
- (b) (1-5) The enclosed Section 585 specification for stone Simulated Streambed Material (Item 585.3401) provides the description of the material size, gradation, and construction requirements. The location and area of the material proposed have been provided on the attached plans.
- (b) (6) Enclosed are plan sheets (see Wetlands Plans sheet 4) to sufficiently indicate the relationship of the project to fixed points of reference, abutting properties, and features of the stream banks.
- (b) (7) Simulated streambed material is recommended for the limits shown on the plan to remove the existing perch at the outlet of the culvert. Proposed flow velocities from the slip lining of the culvert will approximately match that of the existing flows.

(c) N/A

(d) N/A

(e) N/A

SPECIAL PROVISION**AMENDMENT TO SECTION 585 – STONE FILL****Item 585.3401 – Simulated Streambed Material****Add** to Description:

1.2 This work shall consist of furnishing and placing Simulated Streambed Material at the outlet of the culvert located under US Route 302. The material will be used to modify the channel at the outlet to remove the perch and ramps down to match the existing channel.

1.2.1 The Simulated Streambed Material shall be placed in locations as shown on the contract plans. The intent is to protect and replicate the natural streambed environments of the reference reach listed above. The percentage of specific stream bed material was determined in the field utilizing the Wolman Pebble Count methodology. The gradation of substrate particle sizes are based on the Wentworth scale as referenced in the Guidelines for Naturalized River Channel Design and Bank Stabilization.

Add to Materials:

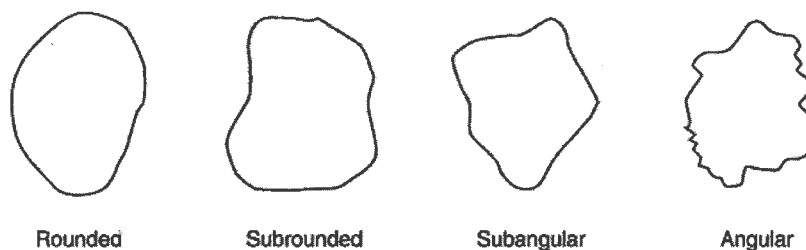
1.1.6 Simulated Streambed Material shall consist of the following gradation:

	% by Weight	
	Culvert Outlet	Sieve Sizes (in)
Item 585	0.3401	
Sand	30%	0.003 to 0.08 (smaller than head of a match)
Gravel	60%	0.08 to 2.5 (between head of match and tennis ball)
Cobble	10%	2.5 to 10.00 (between tennis ball and volleyball)
Boulder	0%	10.0 to > (Larger than volleyball)
Depth	1'-0" to 0'	
Shape	Sub-A	

2.1.6.1 Streambed Material depth is as shown in the table except as noted in the contract plans.

2.1.6.2 Particle shape shall generally conform to:

R = Rounded, Sub-R = Subrounded, Sub-A = Subangular, A = Angular



Add to 3.1:

3.1.3 In accordance with the *Guidelines for Naturalized River Channel Design and Bank Stabilization*, specifically 2.2.1.2 Semi-Natural Form Design, the Streambed Material shall be placed directly on the existing channel floor as shown in the contract plans. In cases where scour protection or streambed anchorage material is required the scour/anchorage material shall be placed first, then the Streambed Material shall be worked into the top 1'-0" filling voids, followed by the depth of Streambed Material specified.

Method of Measurement

Add to Method of Measurement:

4.2 Simulated Streambed Material will be measured by the cubic yard.

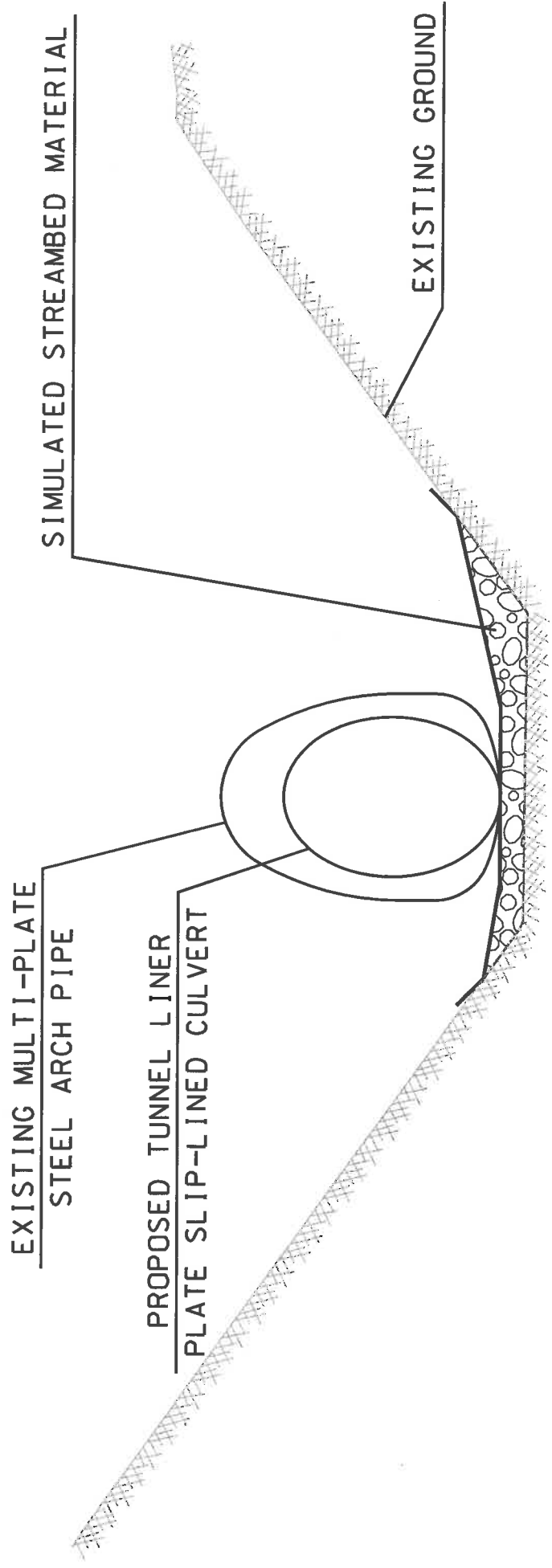
Basis of Payment

Add to Basis of Payment:

5.1.1 The accepted quantity of Simulated Streambed Material will be paid for at the Contract unit price per cubic yard complete in place.

Add to Pay Items and Units:

585.3401	Simulated Streambed Material	Cubic Yard
----------	------------------------------	------------



CULVERT OUTLET SECTION
NOT TO SCALE

Env-Wt 404.05 Walls

The following requirements relative to walls shall apply to nontidal waters.

Address each statement explaining how you meet these requirements.

(1) Walls shall be permitted only where lack of space or other limitations of the site make alternative stabilization methods impractical.

The proposed retaining walls will be replacing existing walls that are currently failing and leaning towards the stream at the inlet of an existing box culvert. The surrounding area is a public park owned by the Town of Bethlehem with the Historical Society and Visitors Center located to the east of the existing walls. The alternative to this would be to remove the walls and grade the slopes adjacent to the stream. This would significantly change the contours and grading of the park, in order to get stable graded slopes, and significantly impact the useable land adjacent to the Historical Society / Visitor's Center building.

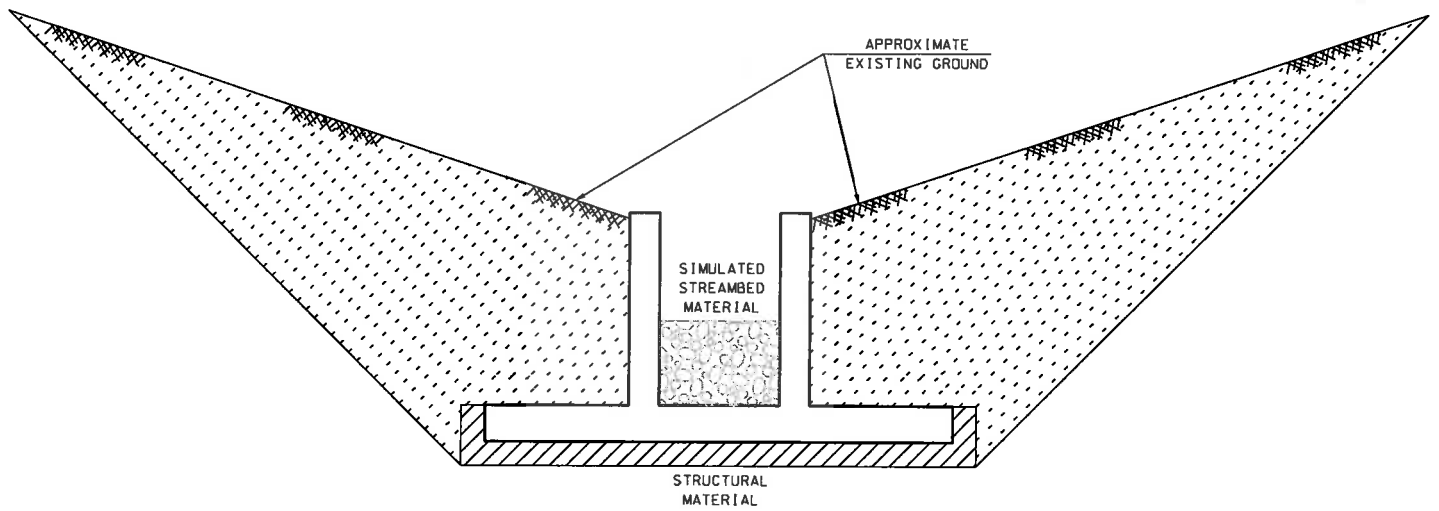
(2) Applications for walls shall include cross-section and plan views of the proposed installation and sufficient plans to clearly indicate the relationship of the project to fixed points of reference, abutting properties, and features of the natural shoreline. See the included Inlet Retaining Wall Detail.

(3) Walls on great ponds or water bodies where the state holds fee simple ownership shall be located on the shoreward side of the normal high-water shoreline.

N/A

(4) Applications for walls adjacent to great ponds or water bodies where the state holds fee simple ownership shall include a stamped surveyed plan showing the location of the normal high water shoreline and the footprint of the proposed project.

N/A



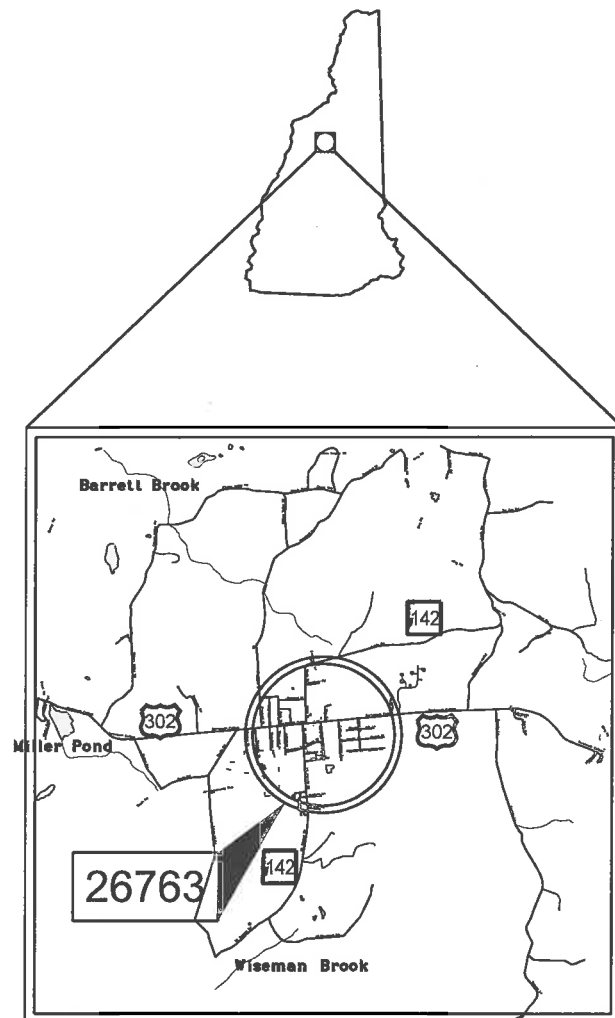
INLET RETAINING WALL DETAIL

NOT TO SCALE

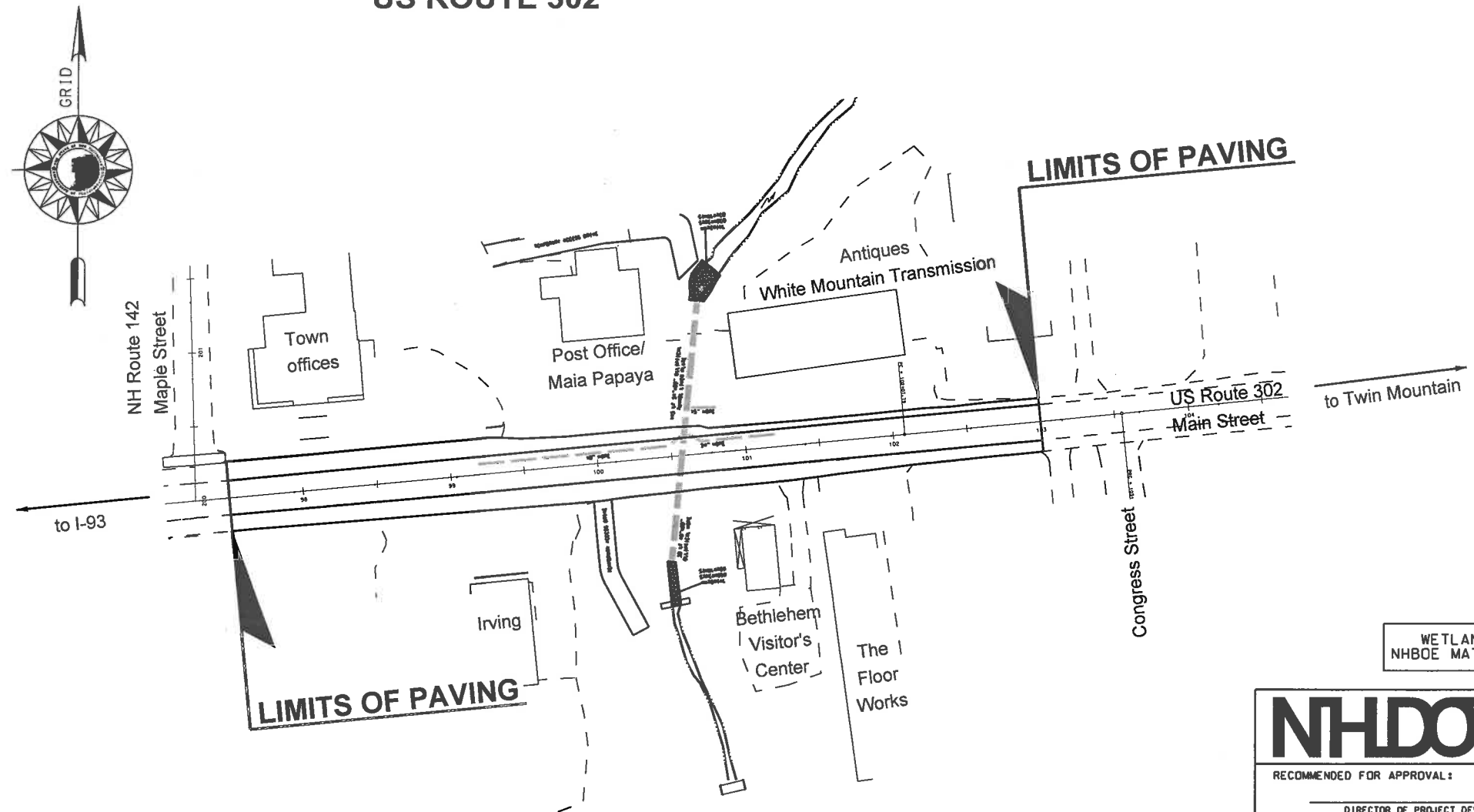
STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION
**WETLANDS PLANS
FEDERAL AID PROJECT**

X-A004(296)
N.H. PROJECT NO. 26763
US ROUTE 302

DESIGN DATA	
AVERAGE DAILY TRAFFIC 20 <u>15</u>	<u>6,200</u>
AVERAGE DAILY TRAFFIC 20 <u>35</u>	<u>7,600</u>
PERCENT OF TRUCKS	<u>9%</u>
DESIGN SPEED	<u>30 MPH</u>
LENGTH OF PROJECT	<u>500 FT</u>



LOCATION MAP



WETLANDS DELINEATED BY
NHBOE MATT URBAN SUMMER 2017

INDEX OF SHEETS

- | | |
|-----|----------------------------|
| 1 | FRONT SHEET |
| 2-3 | STANDARD SYMBOLS SHEETS |
| 4 | WETLAND IMPACT PLANS |
| 5 | EROSION CONTROL STRATEGIES |
| 6-7 | EROSION CONTROL PLANS |

TOWN OF BETHLEHEM

COUNTY OF GRAFTON

SCALE: 1" = 50'
FOR CONSTRUCTION DETAILS - SEE CONSTRUCTION PLANS

NHDOT THE STATE OF
NEW HAMPSHIRE
DEPARTMENT OF
TRANSPORTATION

RECOMMENDED FOR APPROVAL:

DIRECTOR OF PROJECT DEVELOPMENT _____ DATE _____

APPROVED:

ASSISTANT COMMISSIONER AND CHIEF ENGINEER _____ DATE _____

U. S. DEPARTMENT OF
TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

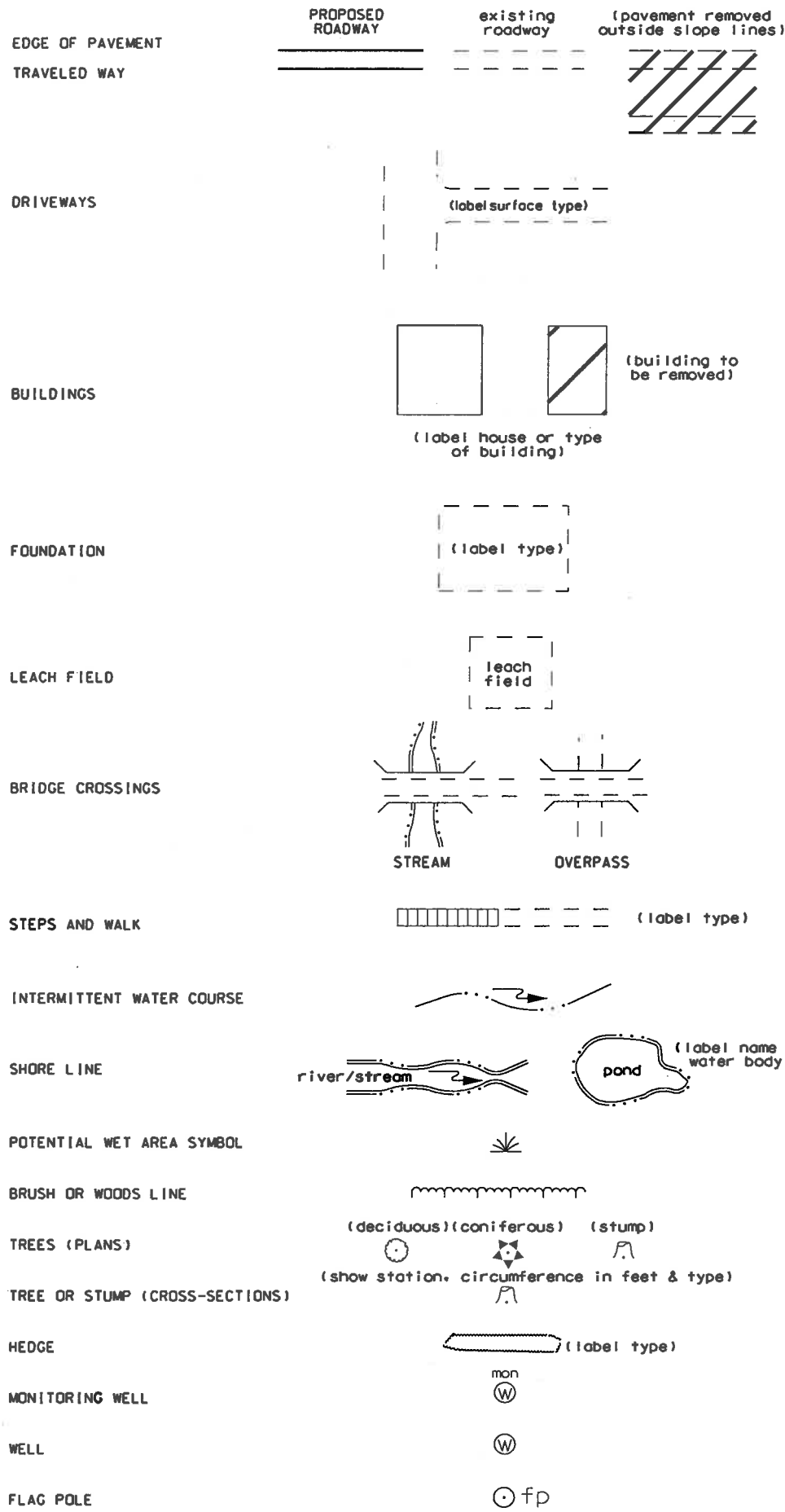
APPROVED:

DIVISION ADMINISTRATOR _____ DATE _____

FEDERAL PROJECT NO.	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
X-A004(296)	26763	1	7

DRAWN BY COLLEEN WHITE DATE 05/2018
CHECKED BY STEPHANIE MICUCCI DATE 05/2018

GENERAL



ORIGINAL GROUND (TYPICALS)

ROCK OUTCROP

ROCK LINE (TYPICALS & SECTIONS ONLY)

GUARDRAIL (label type)

JERSEY BARRIER

CURB (LABEL TYPE)

STONE WALL

RETAINING WALL (LABEL TYPE)

FENCE (LABEL TYPE)

SIGNS

GAS PUMP

FUEL TANK (ABOVE GROUND)

STORAGE TANK FILLER CAP

SEPTIC TANK

GRAVE

MAILBOX

VENT PIPE

SATELLITE DISH ANTENNA

PHONE

GROUND LIGHT/LAMP POST

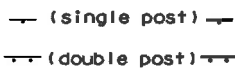
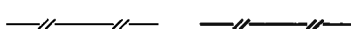
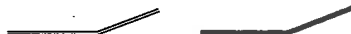
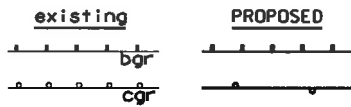
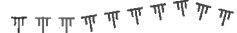
BORING LOCATION

TEST PIT

INTERSTATE NUMBERED HIGHWAY

UNITED STATES NUMBERED HIGHWAY

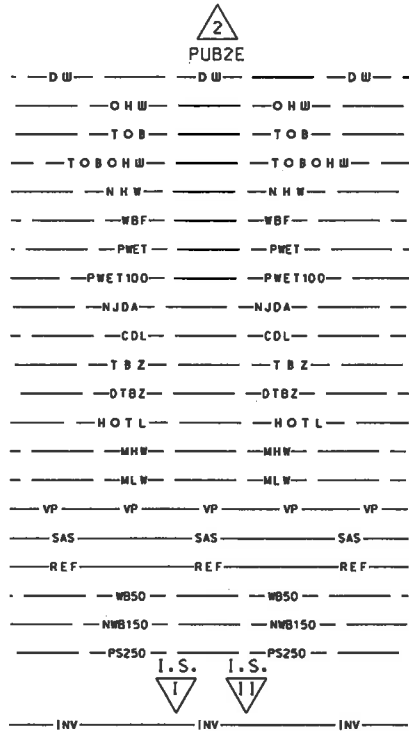
STATE NUMBERED HIGHWAY



SHORELAND - WETLAND

WETLAND DESIGNATION AND TYPE

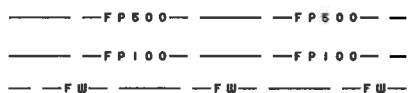
DELINEATED WETLAND
ORDINARY HIGH WATER
TOP OF BANK
TOP OF BANK & ORDINARY HIGH WATER
NORMAL HIGH WATER
WIDTH AT BANK FULL
PRIME WETLAND
PRIME WETLAND 100' BUFFER
NON-JURISDICTIONAL DRAINAGE AREA
COWARDIN DISTINCTION LINE
TIDAL BUFFER ZONE
DEVELOPED TIDAL BUFFER ZONE
HIGHEST OBSERVABLE TIDE LINE
MEAN HIGH WATER
MEAN LOW WATER
VERNAL POOL
SPECIAL AQUATIC SITE
REFERENCE LINE
WATER FRONT BUFFER
NATURAL WOODLAND BUFFER
PROTECTED SHORELAND
INVASIVE SPECIES LABEL



INVASIVE SPECIES

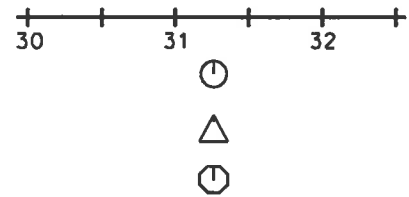
FLOODPLAIN / FLOODWAY

500 YEAR FLOODPLAIN BOUNDARY
100 YEAR FLOODPLAIN BOUNDARY
FLOODWAY

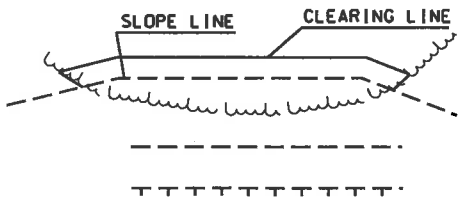


ENGINEERING

CONSTRUCTION BASELINE
PC, PT, POT (ON CONST BASELINE)
PI (IN CONSTRUCTION BASELINES)
INTERSECTION OR EQUATION OF TWO LINES
ORIGINAL GROUND LINE (PROFILES AND CROSS-SECTIONS)
PROFILE GRADE LINE (PROFILES AND CROSS-SECTIONS)



CLEARING LINE
SLOPE LINE
SLOPE LINE (FILL)
SLOPE LINE (CUT)



PROFILES AND CROSS SECTIONS:
ORIGINAL GROUND ELEVATION (LEFT)
FINISHED GRADE ELEVATION (RIGHT)

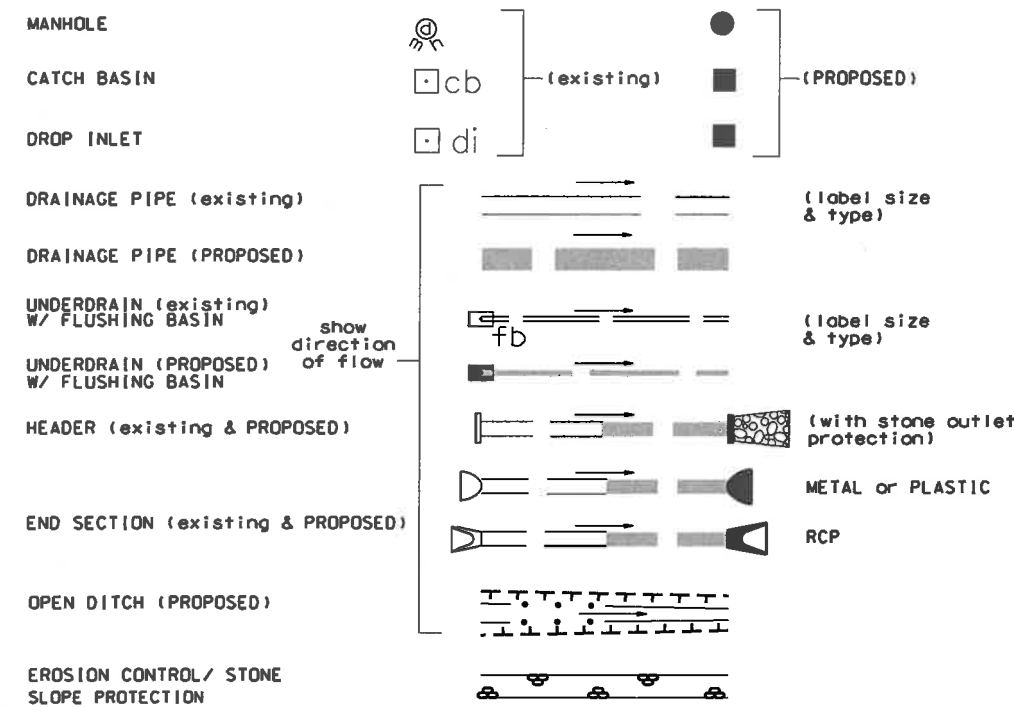
SHEET 1 OF 2

STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN

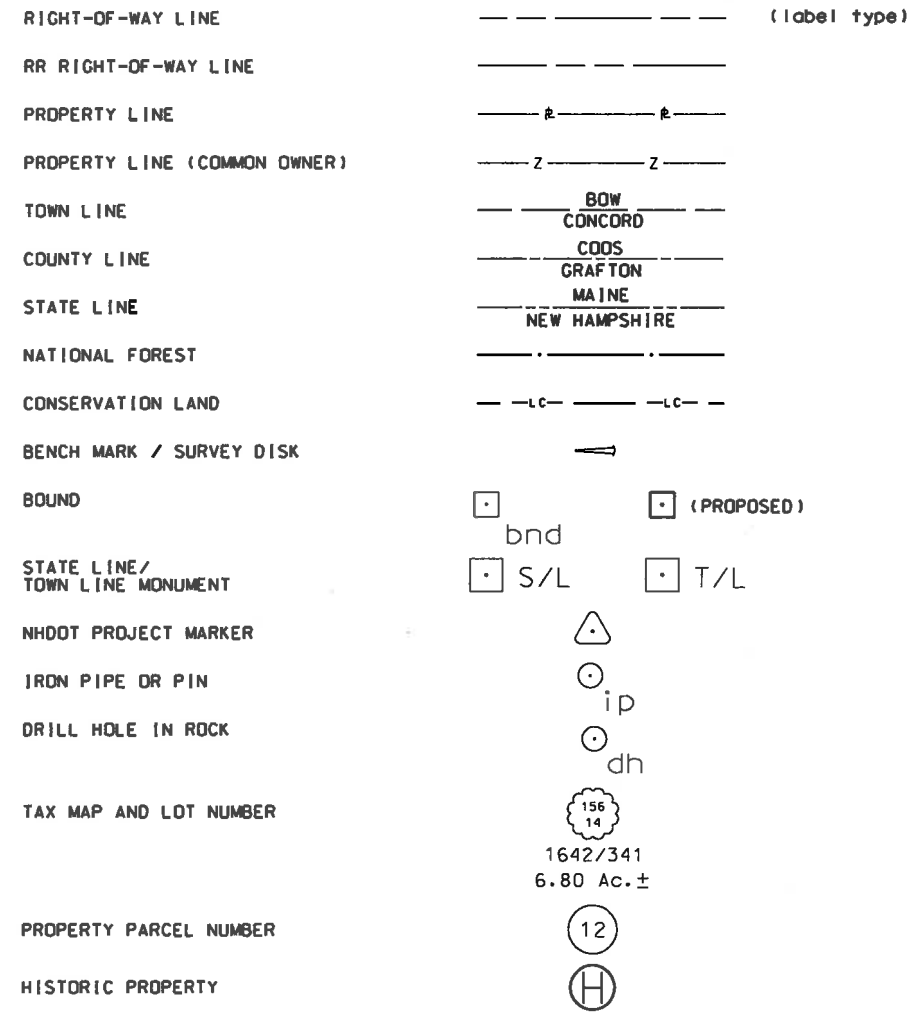
STANDARD SYMBOLS

REVISION DATE	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
11-21-2014	26763 wetsymb	26763	2	7

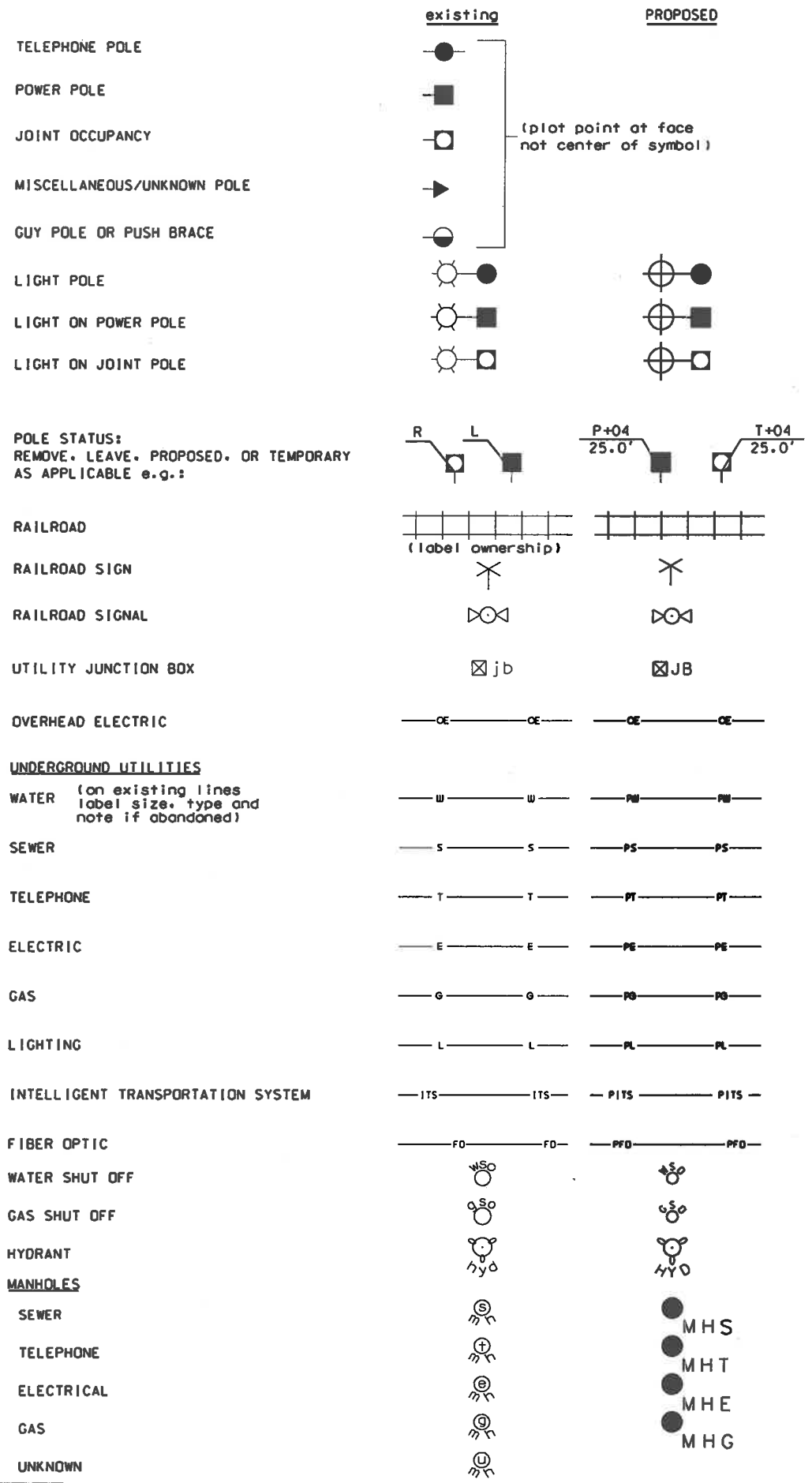
DRAINAGE



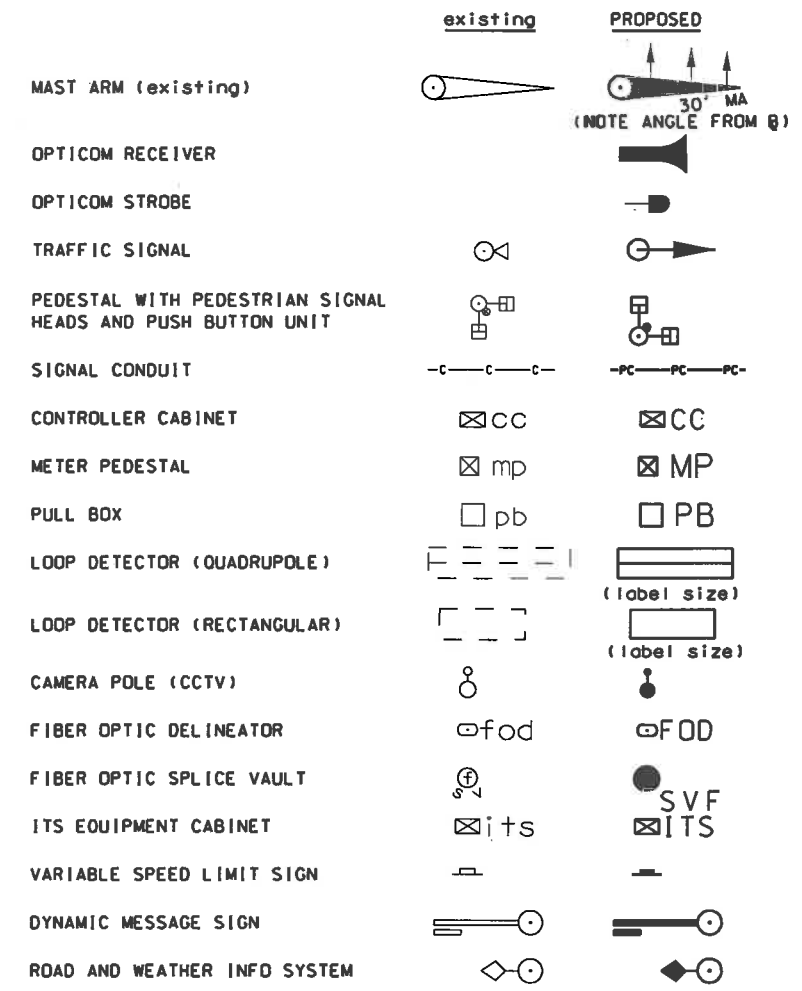
BOUNDARIES / RIGHT-OF-WAY



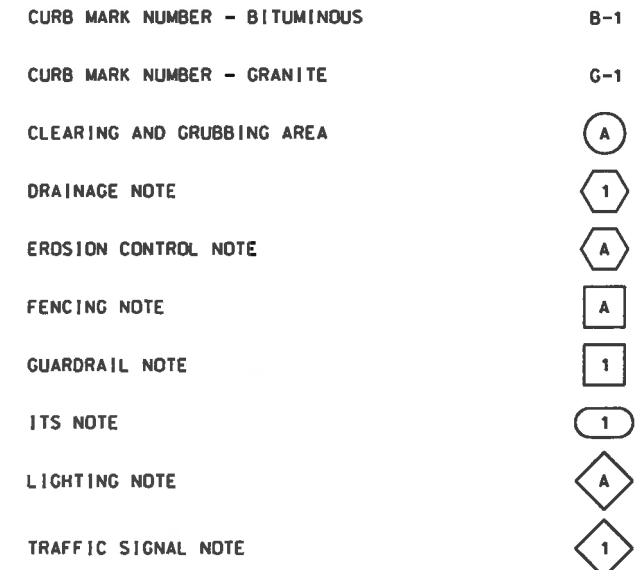
UTILITIES



TRAFFIC SIGNALS / ITS






CONSTRUCTION NOTES







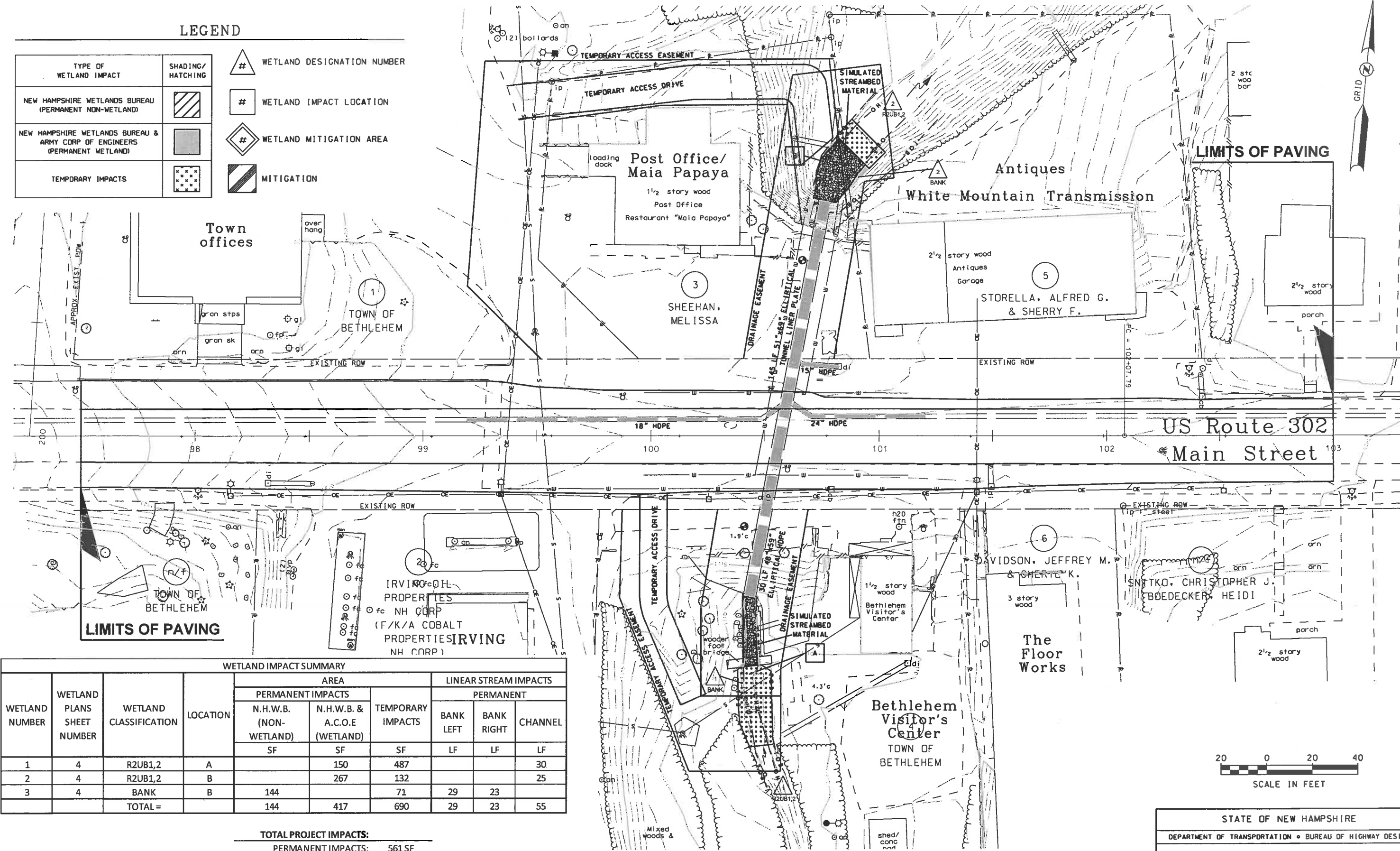
SHEET 2 OF 2

STATE OF NEW HAMPSHIRE				
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN				
STANDARD SYMBOLS				
REVISION DATE	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
11-21-2014	26763 wetsymb	26763	3	7

[illegible]

LEGEND	
TYPE OF WETLAND IMPACT	SHADING/HATCHING
NEW HAMPSHIRE WETLANDS BUREAU (PERMANENT NON-WETLAND)	
NEW HAMPSHIRE WETLANDS BUREAU & ARMY CORP OF ENGINEERS (PERMANENT WETLAND)	
TEMPORARY IMPACTS	

	WETLAND DESIGNATION NUMBER
	WETLAND IMPACT LOCATION
	WETLAND MITIGATION AREA
	MITIGATION



WETLAND IMPACT SUMMARY									
WETLAND NUMBER	WETLAND PLANS SHEET NUMBER	WETLAND CLASSIFICATION	LOCATION	AREA			LINEAR STREAM IMPACTS		
				PERMANENT IMPACTS		TEMPORARY IMPACTS	PERMANENT		
				N.H.W.B. (NON- WETLAND)	N.H.W.B. & A.C.O.E (WETLAND)		BANK LEFT	BANK RIGHT	CHANNEL
				SF	SF				
1	4	R2UB1,2	A		150	487			30
2	4	R2UB1,2	B		267	132			25
3	4	BANK	B	144		71	29	23	
		TOTAL =		144	417	690	29	23	55

TOTAL PROJECT IMPACTS:	
PERMANENT IMPACTS:	561 SF
TEMPORARY IMPACTS:	690 SF
TOTAL IMPACTS:	1251 SF

WETLANDS CLASSIFICATION CODES	
R2UB1,2	RIVERINE, LOWER PERENNIAL, UNCONSOLIDATED BOTTOM, COBBLE-GRAVEL, SAND
BANK	BANK

STATE OF NEW HAMPSHIRE			
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN			
<i>WETLAND IMPACT PLANS</i>			
OGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
26763 WET	26763	4	7

EROSION CONTROL STRATEGIES

1. ENVIRONMENTAL COMMITMENTS:
- 1.1. THESE GUIDELINES DO NOT RELIEVE THE CONTRACTOR FROM COMPLIANCE WITH ANY CONTRACT PROVISIONS, OR APPLICABLE FEDERAL, STATE, AND LOCAL REGULATIONS.
- 1.2. THIS PROJECT WILL BE SUBJECT TO THE US EPA'S NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) STORM WATER CONSTRUCTION GENERAL PERMIT AS ADMINISTERED BY THE ENVIRONMENTAL PROTECTION AGENCY (EPA). THIS PROJECT IS SUBJECT TO REQUIREMENTS IN THE MOST RECENT CONSTRUCTION GENERAL PERMIT (CGP).
- 1.3. THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE NHDES WETLAND PERMIT, THE US ARMY CORPS OF ENGINEERS PERMIT, WATER QUALITY CERTIFICATION AND THE SPECIAL ATTENTION ITEMS INCLUDED IN THE CONTRACT DOCUMENTS.
- 1.4. ALL STORM WATER, EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE NEW HAMPSHIRE STORMWATER MANUAL, VOLUME 3, EROSION AND SEDIMENT CONTROLS DURING CONSTRUCTION (DECEMBER 2008) (BMP MANUAL) AVAILABLE FROM THE NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES (NHDES).
- 1.5. THE CONTRACTOR SHALL COMPLY WITH RSA 485-A:17, AND ALL, PUBLISHED NHDES ALTERATION OF TERRAIN ENV-WO 1500 REQUIREMENTS ([HTTP://DES.NH.GOV/ORGANIZATION/COMMISSIONER/LEGAL/RULES/INDEX.HTM](http://des.nh.gov/organization/commissioner/legal/rules/index.htm))
- 1.6. THE CONTRACTOR IS DIRECTED TO REVIEW AND COMPLY WITH SECTION 107.1 OF THE CONTRACT AS IT REFERS TO SPILLAGE, AND ALSO WITH REGARDS TO EROSION, POLLUTION, AND TURBIDITY PRECAUTIONS.
2. STANDARD EROSION CONTROL SEQUENCING APPLICABLE TO ALL CONSTRUCTION PROJECTS:
- 2.1. PERIMETER CONTROLS SHALL BE INSTALLED PRIOR TO EARTH DISTURBING ACTIVITIES. PERIMETER CONTROLS AND STABILIZED CONSTRUCTION EXITS SHALL BE INSTALLED AS SHOWN IN THE BMP MANUAL AND AS DIRECTED BY THE STORMWATER POLLUTION PREVENTION PLAN (SWPPP) PREPARER.
- 2.2. EROSION, SEDIMENTATION CONTROL MEASURES AND INFILTRATION BASINS SHALL BE CLEANED, REPLACED AND AUGMENTED AS NECESSARY TO PREVENT SEDIMENTATION BEYOND PROJECT LIMITS THROUGHOUT THE PROJECT DURATION.
- 2.3. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSPECTED IN ACCORDANCE WITH THE CONSTRUCTION GENERAL PERMIT AND SECTION 645 OF THE NHDOT SPECIFICATIONS FOR ROAD AND BRIDGES CONSTRUCTION.
- 2.4. AN AREA SHALL BE CONSIDERED STABLE IF ONE OF THE FOLLOWING HAS OCCURRED:
- (A) BASE COURSE GRAVELS HAVE BEEN INSTALLED IN AREAS TO BE PAVED;
- (B) A MINIMUM OF 85% VEGETATED GROWTH HAS BEEN ESTABLISHED;
- (C) A MINIMUM OF 3" OF NON-EROSIVE MATERIAL SUCH AS STONE OR RIP-RAP HAS BEEN INSTALLED;
- (D) TEMPORARY SLOPE STABILIZATION CONFORMING TO TABLE 1 HAS BEEN PROPERLY INSTALLED
- 2.5. ALL STOCKPILES SHALL BE CONTAINED WITH A PERIMETER CONTROL. IF THE STOCKPILE IS TO REMAIN UNDISTURBED FOR MORE THAN 14 DAYS, MULCHING WILL BE REQUIRED.
- 2.6. A WATER TRUCK SHALL BE AVAILABLE TO CONTROL EXCESSIVE DUST AT THE DIRECTION OF THE CONTRACT ADMINISTRATOR.
- 2.7. TEMPORARY EROSION AND SEDIMENTATION CONTROL MEASURES SHALL REMAIN UNTIL THE AREA HAS BEEN PERMANENTLY STABILIZED.
- 2.8. CONSTRUCTION PERFORMED ANY TIME BETWEEN NOVEMBER 30th AND MAY 1st OF ANY YEAR SHALL BE CONSIDERED WINTER CONSTRUCTION AND SHALL CONFORM TO THE FOLLOWING REQUIREMENTS.
- (A) ALL PROPOSED VEGETATED AREAS WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15th, OR WHICH ARE DISTURBED AFTER OCTOBER 15th, SHALL BE STABILIZED IN ACCORDANCE WITH TABLE 1.
- (B) ALL DITCHES OR SWALES WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15th, OR WHICH ARE DISTURBED AFTER OCTOBER 15th, SHALL BE STABILIZED TEMPORARILY WITH STONE OR IN ACCORDANCE WITH TABLE 1.
- (C) AFTER NOVEMBER 30th INCOMPLETE ROAD SURFACES, WHERE WORK HAS STOPPED FOR THE SEASON, SHALL BE PROTECTED IN ACCORDANCE WITH TABLE 1.
- (D) WINTER EXCAVATION AND EARTHWORK SHALL BE DONE SUCH THAT NO MORE THAN 1 ACRE OF THE PROJECT IS WITHOUT STABILIZATION AT ONE TIME, UNLESS A WINTER CONSTRUCTION PLAN HAS BEEN APPROVED BY NHDOT THAT MEETS THE REQUIREMENTS OF ENV-WO 1505.02 AND ENV-WO 1505.05.
- (E) A SWPPP AMENDMENT SHALL BE SUBMITTED TO THE DEPARTMENT, FOR APPROVAL, ADDRESSING COLD WEATHER STABILIZATION (ENV-WO 1505.05) AND INCLUDING THE REQUIREMENTS OF NO LESS THAN 30 DAYS PRIOR TO THE COMMENCEMENT OF WORK SCHEDULED AFTER NOVEMBER 30th.
- GENERAL CONSTRUCTION PLANNING AND SELECTION OF STRATEGIES TO CONTROL EROSION AND SEDIMENT ON HIGHWAY CONSTRUCTION PROJECTS
3. PLAN ACTIVITIES TO ACCOUNT FOR SENSITIVE SITE CONDITIONS:
- 3.1. CLEARLY FLAG AREAS TO BE PROTECTED IN THE FIELD AND PROVIDE CONSTRUCTION BARRIERS TO PREVENT TRAFFICKING OUTSIDE OF WORK AREAS.
- 3.2. CONSTRUCTION SHALL BE SEQUENCED TO LIMIT THE DURATION AND AREA OF EXPOSED SOILS.
- 3.3. PROTECT AND MAXIMIZE EXISTING NATIVE VEGETATION AND NATURAL FOREST BUFFERS BETWEEN CONSTRUCTION ACTIVITY AND SENSITIVE AREAS.
- 3.4. WHEN WORK IS PERFORMED IN AND NEAR WATER COURSES, STREAM FLOW DIVERSION METHODS SHALL BE IMPLEMENTED PRIOR TO ANY EXCAVATION OR FILLING.
- 3.5. WHEN WORK IS PERFORMED WITHIN 50 FEET OF SURFACE WATERS (WETLAND, OPEN WATER OR FLOWING WATER), PERIMETER CONTROL SHALL BE ENHANCED CONSISTENT WITH SECTION 2.1.2.1. OF THE 2012 NPDES CONSTRUCTION GENERAL PERMIT.
4. MINIMIZE THE AMOUNT OF EXPOSED SOIL:
- 4.1. CONSTRUCTION SHALL BE SEQUENCED TO LIMIT THE DURATION AND AREA OF EXPOSED SOILS. MINIMIZE THE AREA OF EXPOSED SOIL AT ANY ONE TIME. PHASING SHALL BE USED TO REDUCE THE AMOUNT AND DURATION OF SOIL EXPOSED TO THE ELEMENTS AND VEHICLE TRACKING.
- 4.2. UTILIZE TEMPORARY MULCHING OR PROVIDE ALTERNATE TEMPORARY STABILIZATION ON EXPOSED SOILS IN ACCORDANCE WITH TABLE 1.
- 4.3. THE MAXIMUM AMOUNT OF DISTURBED EARTH SHALL NOT EXCEED A TOTAL OF 5 ACRES FROM MAY 1st THROUGH NOVEMBER 30th, OR EXCEED ONE ACRE DURING WINTER MONTHS, UNLESS THE CONTRACTOR DEMONSTRATES TO THE DEPARTMENT THAT THE ADDITIONAL AREA OF DISTURBANCE IS NECESSARY TO MEET THE CONTRACTORS CRITICAL PATH METHOD SCHEDULE (CPM), AND THE CONTRACTOR HAS ADEQUATE RESOURCES AVAILABLE TO ENSURE THAT ENVIRONMENTAL COMMITMENTS WILL BE MET.
5. CONTROL STORMWATER FLOWING ONTO AND THROUGH THE PROJECT:
- 5.1. DIVERT OFF SITE RUNOFF OR CLEAN WATER AWAY FROM THE CONSTRUCTION ACTIVITY TO REDUCE THE VOLUME THAT NEEDS TO BE TREATED ON SITE.
- 5.2. DIVERT STORM RUNOFF FROM UPSLOPE DRAINAGE AREAS AWAY FROM DISTURBED AREAS, SLOPES, AND AROUND ACTIVE WORK AREAS AND TO A STABILIZED OUTLET LOCATION.
- 5.3. CONSTRUCT IMPERMEABLE BARRIERS AS NECESSARY TO COLLECT OR DIVERT CONCENTRATED FLOWS FROM WORK OR DISTURBED AREAS.
- 5.4. STABILIZE, TO APPROPRIATE ANTICIPATED VELOCITIES, CONVEYANCE CHANNELS OR PUMPING SYSTEMS NEEDED TO CONVEY CONSTRUCTION STORMWATER TO BASINS AND DISCHARGE LOCATIONS PRIOR TO USE.
- 5.5. DIVERT OFF-SITE WATER THROUGH THE PROJECT IN AN APPROPRIATE MANNER SO NOT TO DISTURB THE UPSTREAM OR DOWNSTREAM SOILS, VEGETATION OR HYDROLOGY BEYOND THE PERMITTED AREA.
6. PROTECT SLOPES:
- 6.1. INTERCEPT AND DIVERT STORM RUNOFF FROM UPSLOPE DRAINAGE AREAS AWAY FROM UNPROTECTED AND NEWLY ESTABLISHED AREAS AND SLOPES TO A STABILIZED OUTLET OR CONVEYANCE.
- 6.2. CONSIDER HOW GROUNDWATER SEEPAGE ON CUT SLOPES MAY IMPACT SLOPE STABILITY AND INCORPORATE APPROPRIATE MEASURES TO MINIMIZE EROSION.
- 6.3. CONVEY STORMWATER DOWN THE SLOPE IN A STABILIZED CHANNEL OR SLOPE DRAIN.
- 6.4. THE OUTER FACE OF THE FILL SLOPE SHOULD BE IN A LOOSE RUFFLED CONDITION PRIOR TO TURF ESTABLISHMENT. TOPSOIL OR HUMUS LAYERS SHALL BE TRACKED UP AND DOWN THE SLOPE, DISKED, HARROWED, DRAGGED WITH A CHAIN OR MAT, MACHINE-RAKED, OR HAND-WORKED TO PRODUCE A RUFFLED SURFACE.
7. ESTABLISH STABILIZED CONSTRUCTION EXITS:
- 7.1. INSTALL AND MAINTAIN CONSTRUCTION EXITS, ANYWHERE TRAFFIC LEAVES A CONSTRUCTION SITE ONTO A PUBLIC RIGHT-OF-WAY.
- 7.2. SWEEP ALL CONSTRUCTION RELATED DEBRIS AND SOIL FROM THE ADJACENT PAVED ROADWAYS AS NECESSARY.
8. PROTECT STORM DRAIN INLETS:
- 8.1. DIVERT SEDIMENT LADEN WATER AWAY FROM INLET STRUCTURES TO THE EXTENT POSSIBLE.
- 8.2. INSTALL SEDIMENT BARRIERS AND SEDIMENT TRAPS AT INLETS TO PREVENT SEDIMENT FROM ENTERING THE DRAINAGE SYSTEM.
- 8.3. CLEAN CATCH BASINS, DRAINAGE PIPES, AND CULVERTS IF SIGNIFICANT SEDIMENT IS DEPOSITED.
- 8.4. DROP INLET SEDIMENT BARRIERS SHOULD NEVER BE USED AS THE PRIMARY MEANS OF SEDIMENT CONTROL AND SHOULD ONLY BE USED TO PROVIDE AN ADDITIONAL LEVEL OF PROTECTION TO STRUCTURES AND DOWN-GRADIENT SENSITIVE RECEPTORS.
9. SOIL STABILIZATION:
- 9.1. WITHIN THREE DAYS OF THE LAST ACTIVITY IN AN AREA, ALL EXPOSED SOIL AREAS, WHERE CONSTRUCTION ACTIVITIES ARE COMPLETE, SHALL BE STABILIZED.
- 9.2. IN ALL AREAS, TEMPORARY SOIL STABILIZATION MEASURES SHALL BE APPLIED IN ACCORDANCE WITH THE STABILIZATION REQUIREMENTS (SECTION 2.2) OF THE 2012 CGP. (SEE TABLE 1 FOR GUIDANCE ON THE SELECTION OF TEMPORARY SOIL STABILIZATION MEASURES.)
- 9.3. EROSION CONTROL SEED MIX SHALL BE SOWN IN ALL INACTIVE CONSTRUCTION AREAS THAT WILL NOT BE PERMANENTLY SEEDED WITHIN TWO WEEKS OF DISTURBANCE AND PRIOR TO SEPTEMBER 15, OF ANY GIVEN YEAR, IN ORDER TO ACHIEVE VEGETATIVE STABILIZATION PRIOR TO THE END OF THE GROWING SEASON.
- 9.4. SOIL TACKIFIERS MAY BE APPLIED IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS AND REAPPLIED AS NECESSARY TO MINIMIZE SOIL AND MULCH LOSS UNTIL PERMANENT VEGETATION IS ESTABLISHED.
10. RETAIN SEDIMENT ON-SITE AND CONTROL DEWATERING PRACTICES:
- 10.1. TEMPORARY SEDIMENT BASINS (CGP-SECTION 2.1.3.2) OR SEDIMENT TRAPS (ENV-WO 1506.10) SHALL BE SIZED TO RETAIN, ON SITE, THE VOLUME OF A 2-YEAR 24-HOUR STORM EVENT FOR ANY AREA OF DISTURBANCE OR 3,600 CUBIC FEET OF STORMWATER RUNOFF PER ACRE OF DISTURBANCE, WHICHEVER IS GREATER. TEMPORARY SEDIMENT BASINS USED TO TREAT STORMWATER RUNOFF FROM AREAS GREATER THAN 5-ACRES OF DISTURBANCE SHALL BE SIZED TO ALSO CONTROL STORMWATER RUNOFF FROM A 10-YEAR 24 HOUR STORM EVENT. ON-SITE RETENTION OF THE 10-YEAR 24-HOUR EVENT IS NOT REQUIRED.
- 10.2. CONSTRUCT AND STABILIZE DEWATERING INFILTRATION BASINS PRIOR TO ANY EXCAVATION THAT MAY REQUIRE DEWATERING.
- 10.3. TEMPORARY SEDIMENT BASINS OR TRAPS SHALL BE PLACED AND STABILIZED AT LOCATIONS WHERE CONCENTRATED FLOW (CHANNELS AND PIPES) DISCHARGE TO THE SURROUNDING ENVIRONMENT FROM AREAS OF UNSTABILIZED EARTH DISTURBING ACTIVITIES.

11. ADDITIONAL EROSION AND SEDIMENT CONTROL GENERAL PRACTICES:
- 11.1. USE TEMPORARY MULCHING, PERMANENT MULCHING, TEMPORARY VEGETATIVE COVER, AND PERMANENT VEGETATIVE COVER TO REDUCE THE NEED FOR DUST CONTROL. USE MECHANICAL SWEEPERS ON PAVED SURFACES WHERE NECESSARY TO PREVENT DUST BUILDUP. APPLY WATER, OR OTHER DUST INHIBITING AGENTS OR TACKIFIERS, AS APPROVED BY THE NHDES.
- 11.2. ALL STOCKPILES SHALL BE CONTAINED WITH TEMPORARY PERIMETER CONTROLS. INACTIVE SOIL STOCKPILES SHOULD BE PROTECTED WITH SOIL STABILIZATION MEASURES (TEMPORARY EROSION CONTROL SEED MIX AND MULCH, SOIL BINDER) OR COVERED WITH ANCHORED TARPS.
- 11.3. EROSION AND SEDIMENT CONTROL MEASURES WILL BE INSPECTED IN ACCORDANCE WITH SECTION 645 OF NHDOT SPECIFICATIONS, WEEKLY AND WITHIN 24 HOURS AFTER ANY STORM EVENT GREATER THAN 0.25 IN. OF RAIN PER 24-HOUR PERIOD. EROSION AND SEDIMENT CONTROL MEASURES WILL ALSO BE INSPECTED IN ACCORDANCE WITH THE GUIDANCE MEMO FROM THE NHDES CONTAINED WITHIN THE CONTRACT PROPOSAL AND THE EPA CONSTRUCTION GENERAL PERMIT.
- 11.4. THE CONTRACTOR SHOULD UTILIZE STORM DRAIN INLET PROTECTION TO PREVENT SEDIMENT FROM ENTERING A STORM DRAINAGE SYSTEM PRIOR TO THE PERMANENT STABILIZATION OF THE CONTRIBUTING DISTURBED AREA.
- 11.5. PERMANENT STABILIZATION MEASURES WILL BE CONSTRUCTED AND MAINTAINED IN LOCATIONS AS SHOWN ON THE CONSTRUCTION PLANS TO STABILIZE AREAS. VEGETATIVE STABILIZATION SHALL NOT BE CONSIDERED PERMANENTLY STABILIZED UNTIL VEGETATIVE GROWTH COVERS AT LEAST 85% OF THE DISTURBED AREA. THE CONTRACTOR SHALL BE RESPONSIBLE FOR EROSION AND SEDIMENT CONTROL FOR ONE YEAR AFTER PROJECT COMPLETION.
- 11.6. CATCH BASINS: CARE SHALL BE TAKEN TO ENSURE THAT SEDIMENTS DO NOT ENTER ANY EXISTING CATCH BASINS DURING CONSTRUCTION. THE CONTRACTOR SHALL PLACE TEMPORARY STONE INLET PROTECTION OVER INLETS IN AREAS OF SOIL DISTURBANCE THAT ARE SUBJECT TO SEDIMENT CONTAMINATION.
- 11.7. TEMPORARY AND PERMANENT DITCHES SHALL BE CONSTRUCTED, STABILIZED AND MAINTAINED IN A MANNER THAT WILL MINIMIZE SCOUR. TEMPORARY AND PERMANENT DITCHES SHALL BE DIRECTED TO DRAIN TO SEDIMENT BASINS OR STORM WATER COLLECTION AREAS.
- 11.8. WINTER EXCAVATION AND EARTHWORK ACTIVITIES NEED TO BE LIMITED IN EXTENT AND DURATION, TO MINIMIZE POTENTIAL EROSION AND SEDIMENTATION IMPACTS. THE AREA OF EXPOSED SOIL SHALL BE LIMITED TO ONE ACRE, OR THAT WHICH CAN BE STABILIZED AT THE END OF EACH DAY UNLESS A WINTER CONSTRUCTION PLAN, DEVELOPED BY A QUALIFIED ENGINEER OR A CPESC SPECIALIST, IS REVIEWED AND APPROVED BY THE DEPARTMENT.
- 11.9. CHANNEL PROTECTION MEASURES SHALL BE SUPPLEMENTED WITH PERIMETER CONTROL MEASURES WHEN THE DITCH LINES OCCUR AT THE BOTTOM OF LONG FILL SLOPES. THE PERIMETER CONTROLS SHALL BE INSTALLED ON THE FILL SLOPE TO MINIMIZE THE POTENTIAL FOR FILL SLOPE SEDIMENT DEPOSITS IN THE DITCH LINE.

BEST MANAGEMENT PRACTICES (BMP) BASED ON AMOUNT OF OPEN CONSTRUCTION AREA

12. STRATEGIES SPECIFIC TO OPEN AREAS LESS THAN 5 ACRES:
- 12.1. THE CONTRACTOR SHALL COMPLY WITH RSA 485-A:17 AND ENV-WO 1500: ALTERATION OF TERRAIN FOR CONSTRUCTION AND USE ALL CONVENTIONAL BMP STRATEGIES.
- 12.2. SLOPES STEEPER THAN 3:1 WILL RECEIVE TURF ESTABLISHMENT WITH MATTING.
- 12.3. SLOPES 3:1 OR FLATTER WILL RECEIVE TURF ESTABLISHMENT ALONE.
- 12.4. AREAS WHERE HAUL ROADS ARE CONSTRUCTED AND STORMWATER CANNOT BE TREATED THE DEPARTMENT WILL CONSIDER INFILTRATION.
- 12.5. FOR HAUL ROADS ADJACENT TO SENSITIVE ENVIRONMENTAL AREAS OR STEEPER THAN 5%, THE DEPARTMENT WILL CONSIDER USING EROSION STONE, CRUSHED GRAVEL, OR CRUSHED STONE BASE TO HELP MINIMIZE EROSION ISSUES.
- 12.6. ALL AREAS THAT CAN BE STABILIZED SHALL BE STABILIZED PRIOR TO OPENING UP NEW TERRITORY.
- 12.7. DETENTION BASINS SHALL BE DESIGNED AND CONSTRUCTED TO ACCOMMODATE A 2 YEAR STORM EVENT.
13. STRATEGIES SPECIFIC TO OPEN AREAS BETWEEN 5 AND 10 ACRES:
- 13.1. THE CONTRACTOR SHALL COMPLY WITH RSA 485-A:17 AND ENV-WO 1500 ALTERATION OF TERRAIN AND SHALL USE CONVENTIONAL BMP STRATEGIES AND ALL TREATMENT OPTIONS USED FOR UNDER 5 ACRES WILL BE UTILIZED.
- 13.2. DETENTION BASINS WILL BE CONSTRUCTED TO ACCOMMODATE THE 2-YEAR 24-HOUR STORM EVENT AND CONTROL A 10-YEAR 24-HOUR STORM EVENT.
- 13.3. SLOPES STEEPER THAN A 3:1 WILL RECEIVE TURF ESTABLISHMENT WITH MATTING OR OTHER TEMPORARY SOIL STABILIZATION MEASURES DETAILED IN TABLE 1. THE CONTRACTOR MAY ALSO CONSIDER A SOIL BINDER IN ACCORDANCE WITH THE NHDES APPROVALS OR REGULATIONS. OTHER ALTERNATIVE MEASURES, SUCH AS BONDED FIBER MATRIXES (BFMS) OR FLEXIBLE GROWTH MEDIUMS (FGMS) MAY BE UTILIZED, IF MEETING THE NHDES APPROVALS AND REGULATIONS.
- 13.4. SLOPES 3:1 OR FLATTER WILL RECEIVE TURF ESTABLISHMENT OR OTHER TEMPORARY SOIL STABILIZATION MEASURES DETAILED IN TABLE 1. THE CONTRACTOR MAY ALSO CONSIDER A SOIL BINDER IN ACCORDANCE WITH THE NHDES APPROVALS OR REGULATIONS.
14. STRATEGIES SPECIFIC TO OPEN AREAS OVER 10 ACRES:
- 14.1. THE CONTRACTOR SHALL COMPLY WITH RSA 485-A:17 AND ENV-WO 1500 ALTERATION OF TERRAIN AND SHALL USE CONVENTIONAL BMP STRATEGIES AND ALL TREATMENT OPTIONS USED FOR UNDER 5 ACRES AND BETWEEN 5 AND 10 ACRES WILL BE UTILIZED.
- 14.2. THE DEPARTMENT ANTICIPATES THAT SOIL BINDERS WILL BE NEEDED ON ALL SLOPES STEEPER THAN 3:1, IN ORDER TO MINIMIZE EROSION AND REDUCE THE AMOUNT OF SEDIMENT IN THE STORMWATER TREATMENT BASINS.
- 14.3. THE CONTRACTOR WILL BE REQUIRED TO HAVE AN APPROVED DESIGN IN ACCORDANCE WITH ENV-WO 1506.12 FOR AN ACTIVE FLOCCULANT TREATMENT SYSTEM TO TREAT AND RELEASE WATER CAPTURED IN STORM WATER BASINS. THE CONTRACTOR SHALL ALSO RETAIN THE SERVICES OF AN ENVIRONMENTAL CONSULTANT WHO HAS DEMONSTRATED EXPERIENCE IN THE DESIGN OF FLOCCULANT TREATMENT SYSTEMS. THE CONSULTANT WILL ALSO BE RESPONSIBLE FOR THE IMPLEMENTATION AND MONITORING OF THE SYSTEM.

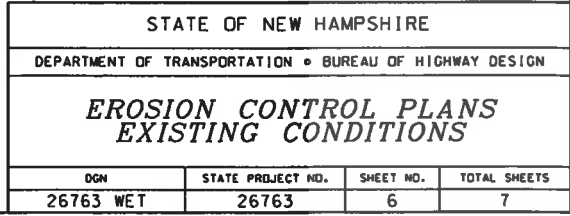
TABLE 1
GUIDANCE ON SELECTING TEMPORARY SOIL STABILIZATION MEASURES

APPLICATION AREAS	DRY MULCH METHODS				HYDRAULICALLY APPLIED MULCHES ²				ROLLED EROSION CONTROL BLANKETS ³			
	HMT	WC	SG	CB	HM	SMM	BFM	FRM	SNSB	DNBS	DNCSB	DNCS
SLOPES ¹												
STEEPER THAN 2:1	NO	NO	YES	NO	NO	NO	NO	YES	NO	NO	NO	YES
2:1 SLOPE	YES	YES	YES	YES	NO	NO	YES	YES	NO	YES	YES	YES
3:1 SLOPE	YES	YES	YES	YES	NO	YES	YES	YES	YES	YES	YES	NO
4:1 SLOPE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	NO	NO
WINTER STABILIZATION	4T/AC	YES	YES	YES	NO	NO	YES	YES	YES	YES	YES	YES
CHANNELS												
LOW FLOW CHANNELS	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES	YES
HIGH FLOW CHANNELS	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES

ABBREV.	STABILIZATION MEASURE	ABBREV.	STABILIZATION MEASURE	ABBREV.	STABILIZATION MEASURE
HMT	HAY MULCH & TACK	HM	HYDRAULIC MULCH	SNSB	SINGLE NET STRAW BLANKET
WC	WOOD CHIPS	SMM	STABILIZED MULCH MATRIX	DNBS	DOUBLE NET STRAW BLANKET
SG	STUMP GRINDINGS	BFM	BONDED FIBER MATRIX	DNCSB	2 NET STRAW-COCONUT BLANKET
CB	COMPOST BLANKET	FRM	FIBER REINFORCED MEDIUM	DNCS	2 NET COCONUT BLANKET

- NOTES:
1. ALL SLOPE STABILIZATION OPTIONS ASSUME A SLOPE LENGTH \leq 10 TIMES THE HORIZONTAL DISTANCE COMPONENT OF THE SLOPE, IN FEET.
2. PRODUCTS CONTAINING POLYACRYLAMIDE (PAM) SHALL NOT BE APPLIED DIRECTLY TO OR WITHIN 100 FEET OF ANY SURFACE WATER WITHOUT PRIOR WRITTEN APPROVAL FROM THE NH DEPARTMENT OF ENVIRONMENTAL SERVICES.
3. ALL EROSION CONTROL BLANKETS SHALL BE MADE WITH WILDLIFE FRIENDLY BIODEGRADABLE NETTING.

STATE OF NEW HAMPSHIRE				
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN				
WETLAND IMPACT PLANS				
REVISION DATE	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
12-21-2015	erosstrat	26763	5	7

6763 WET.dgn 6/5/2018 10:42:28 AM "n34jdl"

6763 WET.dgn 6/5/2018 10:42:29 AM "n34jdl"

